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REPORTS

DATE:

2001



**Tipperary Corporation
Tatum Pit Closure Project
Annual Sampling Summary**

RECEIVED

APR 30 2001

**ENVIRONMENTAL BUREAU
OIL CONSERVATION DIVISION**



**Whole Earth Environmental
19606 San Gabriel
Houston, Tx. 77084**



Tipperary CORPORATION

633 Seventeenth Street
Suite 1550
Denver, Colorado 80202

November 29, 1999

CERTIFIED MAIL

Mr. William C. Olson
New Mexico Oil Conservation Division
2040 South Pacheco
Santa Fe, NM 87505

**RE: July 1999 Progress Report
October 1999 Progress Report
Tatum Pit Closure Project
Lea County, NM**

Dear Mr. Olson:

Please find enclosed additional monitor well results from the subject project area. This data represents results from our eighth and ninth quarters of monitoring. We would like to request permission to submit our monitoring results annually to your office. Of course, we will continue to sample and monitor the project quarterly.

We have also addressed the requests and issues in your letter of August 6, 1999 correspondence (copy attached). Our responses are found in the Executive Summary section. Additional data included in the Executive Summary section is summarized below:

- Surveyed locations of each pit center and all recovery and monitor wells including surface elevations. The above information is plotted on a topographic base map. Individual site plat maps are included within each well/pit section.
- A table of monitor well water elevations. This table includes a calculation of the hydraulic gradient for each well/pit site.
- A graph of the depths to water in each monitor well. The data covers the last two sampling quarters and the depth of water when the monitor wells were drilled.
- A graph of the monthly rainfall totals as measured in Lovington, NM. Also included is a table of weather data recorded by Lea County Electric Co-Op.
- A graph comparing the average BTEX concentrations measured each quarter with the quarterly rainfall to establish a direct relationship with the amount of precipitation.
- A summary table of results from BTEX sampling with a plot of results.
- Copies of the BTEX analyses from Environmental Lab of Texas, Inc.
- A procedure for developing cased water monitoring wells.




Mr. William C. Olson
November 29, 1999
Page 2.

Data for each well/pit is summarized in its own section. The following data is included under each well/pit section.

- A summary of monitoring activity for each monitor well.
- A summary of BTEX results for each recovery and monitor well. A bar graph of this data is presented.
- A topographic map for each well/pit.
- A site map with the location of the pit and monitor wells including the surface elevations.
- A table of water elevations from the monitor wells along with a calculation of the hydraulic gradient for each well/pit.

We have also submitted formal closure reports for the Vera #1 and State NBN #1 sites under separate cover. If you have any questions, please call me at (303) 293-9379.

Very truly yours,



Larry G. Sugano
Vice President - Engineering

cc: NMOCD Hobbs Office
Enclosures



STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

August 6, 1999

CERTIFIED MAIL
RETURN RECEIPT NO. Z-274-520-689

Mr. Larry G. Sugano
Tipperary Corporation
633 Seventeenth St., Suite 1550
Denver, Colorado 80202

RE: TATUM PIT CLOSURES

Dear Mr. Sugano:

The New Mexico Oil Conservation Division (OCD) has reviewed Tipperary Corporation's (TC) April 27, 1999 "APRIL 1999 PROGRESS REPORT, TATUM PIT CLOSURE PROJECT, LEA COUNTY, NEW MEXICO". This document contains the results of TC's monitoring of ground water contamination related to the closure of 10 unlined pits west of Tatum, New Mexico. The document also requests final closure of the remedial actions related to unlined pits at the State NBN #1 and Vera #1 sites and proposes modifications to the ground water sampling program.

In order to complete a review of the above referenced closure requests and sampling modifications, the OCD requires that TC submit the following information, with all maps, tables and data segregated into separate case files for each site:

1. A water table potentiometric map for each site which shows the location of the pit and excavated areas, the surveyed locations of all monitor wells and recovery wells and any other pertinent site features as well as the direction and magnitude of the hydraulic gradient created using the water table elevation in each monitor well. On March 29, 1999, the OCD required that TC submit this information. The above referenced document states that TC was preparing the maps. To date the OCD has not received this required information.
2. Tables of water table elevations in each monitor well during each sampling event. The document discusses seasonal fluctuations in the water table as responsible for increases in contaminant concentrations in ground water. However, the supporting water table elevation vs. time data for each monitor well is not provided.
3. Tables of all past and present water quality sampling results for each ground water monitoring and recovery well as required in the OCD's January 15, 1999 conditions of approval. The document only contains analytical data for ground water monitoring wells that are currently being sampled.

Mr. Larry G. Sugano
August 6, 1999
Page 2

4. An explanation of the use of drill cuttings as backfill in the annular space above the bentonite plug in each newly constructed monitor well. This is a direct violation of the OCD's January 15, 1999 conditions of approval which required that the remainder of the annular space be grouted to the surface with cement containing 3-5% bentonite. As a result the monitor wells as constructed by TC are potentially direct conduits to ground water. ✓
- ✓ 5. The monitor well development procedures and volumes for each monitor well. ✓
6. The volume of ground water and product recovered to date at all sites with fluid recovery as required in the OCD's January 15, 1999 conditions of approval. ✓ *Monitor Wells*
7. A completed OCD pit closure and remediation report form for each site requested for closure. Each form will contain a discussion and the results of all soil and ground water site closure activities including all soil analytical data from the excavations and the backfilled materials as well as figures showing all sample locations.

The above required information shall be submitted to the OCD Santa Fe Office by October 4, 1999 with a copy provided to the OCD Hobbs District Office. Submission of this information will allow the OCD to complete a review of TC's closure requests and proposed ground water sampling plan modifications.

If you have any questions or comments, please call me at (505) 827-7154.

Sincerely,



William C. Olson
Hydrologist
Environmental Bureau

xc: Chris Williams, OCD Hobbs District Office
Mike Matush, NM State Land Office
Mike Griffin, Whole Earth Environmental, Inc.



OCD 8/6/99 Request for Additional Data

Scope

This report addresses the August 6th request from Mr. Olson (enclosed) requesting additional information.

Request # 1

A water table potentiometric map for each site which shows the location of the pit and excavated areas, the surveyed locations of all monitoring wells and recovery wells and any other pertinent features as well as the direction and magnitude of the hydraulic gradient created using the water table elevation in each monitoring well.

Response

The locations of each pit center, and of all recovery and monitor wells was surveyed by Adkins Engineering on August 18, 1999 (see *Coordinate File: Tipperary.CRD* within this section). The data was incorporated into previously rendered plat AutoCad maps and overlaid atop USGS 7.5' maps by Basin Surveying. A copy of each site's plat map is enclosed within the appropriate section of this report. Similar maps are included within a final closure report for Vera and State NBN submitted under separate cover.

Request # 2

Tables of water table elevations in each monitor well during each sampling event. The document discusses seasonal fluctuations in the water table as responsible for increases in contaminant concentrations in ground water. However the supporting water table elevation vs. time data for each monitor well is not provided.

Response

We've only three data points for the water table elevations within the monitoring wells. The first is from the original drilling report when the well was first installed; the second, was measured on 8/9/99; the third, on 10/21/99. In the future, the elevations for each monitor well will be measured at the time of sampling and included within the annual report.

Included within this Executive Summary section are the following charts and graphs:

A. Chart titled "*Tipperary Corporation Tatum Pit Closure Project Monitor Well Water Elevation Table*". This table summarizes the results of the original drillers log and the two sampling events. the chart also provides the calculated gradient for each monitor well.

B. Line Graph titled "*Tipperary Corporation Monitor Well Depths*". This graph compares the depth to water during each sampling event.

C. Chart titled "*Lea County Electrical Coop Weather Report 1998, 1999*". These are detailed daily measurements of the precipitation received at the LEACO Lovington, New Mexico plant located approximately twenty-five miles southeast of the Tatum Field.

D. Line Graph titled "*Monthly Rainfall Totals*". This graph takes the detailed monthly total rainfall figures from the LEACO chart and plots the information into line form for comparison purposes. Included within the map is a line showing the average monthly rainfall for the Tatum area. This number was calculated by taking the average annual rainfall for Tatum and dividing by 12.

Request # 3

Tables of all past and present water quality sampling results for each ground water monitoring and recovery well as required in the OCD's January 15, 1999 conditions of approval.

Response

Each monitor well was generally sampled each quarter and the results of each test are summarized within the Sampling Results charts and graphs for each well. The only exceptions to this are Monitor Well #1 in which we had five consecutive quarters of acceptable concentrations, Monitor Well # 3 in which we encountered mechanical problems in removing a bailer, NBN and Vera in which we've requested final closure and the three recovery wells.

Each recovery and monitor well will be sampled each quarter and the results provided to the OCD on an annual basis.

Request # 4

An explanation of the use of drill cuttings in the annular space above the bentonite plug in each newly constructed monitor well.

Response

The error is a result of a lack of oversight of the completion of the wells by Whole Earth Environmental. We believed that the instructions were correctly conveyed to the driller. We did not directly supervise the final completion of the wells.

Request # 5

The monitor well development procedures and volumes for each monitoring well.

Response

Enclosed within this Executive Summary section is "*WEQP-28, Procedure for Developing Cased Water Monitoring Wells*". The procedure calls for the removal of three well casing volumes. The formula for determining casing volume is attached as a supplement to WEQP-28 and shows that with a water column height of 15', a total of 7.344 gallons of water must be bailed to achieve the minimum volume. In fact at least fifteen gallons of fluid were removed from each well in order to minimize turbidity. Neither Whole Earth nor Adkins Engineering maintained a log of the volumes of water removed however the procedure has been amended to insure that such information will be recorded and transmitted to the OCD in the future.

Request # 6

The volume of ground water and product recovered to date at all sites with fluid recovery as required in the OCD's January 15, 1999 conditions of approval.

Response

The fluids removed from each recovery well are pumped directly from the windmills into an open top fiberglass tank. Each tank is equipped with a liquid level controller which, when activated, engages an electric pump that sends the fluids to a steel water storage tank used in conjunction with the normal operations of the oil wells at each location. The water is subsequently pumped into the Burro Pipeline disposal system to the Satellite 5 facility. Satellite 5 is equipped with separation equipment that strips the hydrocarbons from the water through gravity separation. The eventual fate of the hydrocarbon fractions is to the sales line, and the water into a Burro Pipeline disposal well.

The fluid volumes are so low that they cannot be accurately measured by comparing "before" and "after" process volumes. However, each windmill has the capacity to produce up to 1,375 gallons per day. The approximate ratio of recovered oil to water is 1:100. The windmills are shut in during freezing weather, and otherwise operate at an estimated efficiency of between 25-75% of capacity. We therefore estimate that a liberal estimate of the total fluid removal would be in the range of 50% of the windmill's capacity or 687 gallons per day with a hydrocarbon fraction of up to 6.9 g/d.

Using these figures, we calculate that each windmill has produced a water volume of approximately 17,862 gallons and a hydrocarbon volume of 179 gallons in the time period between September, 1997, (the date of their erection), and October, 1999.

Request # 7

A completed pit closure and remediation report for each site requested for closure. Each form will contain a discussion of the results of all soil and ground water site closure activities including all soil analytical data from the excavations and the backfilled materials as well as figures showing all sample locations.

Response

As requested, the information is provided to you under separate cover.

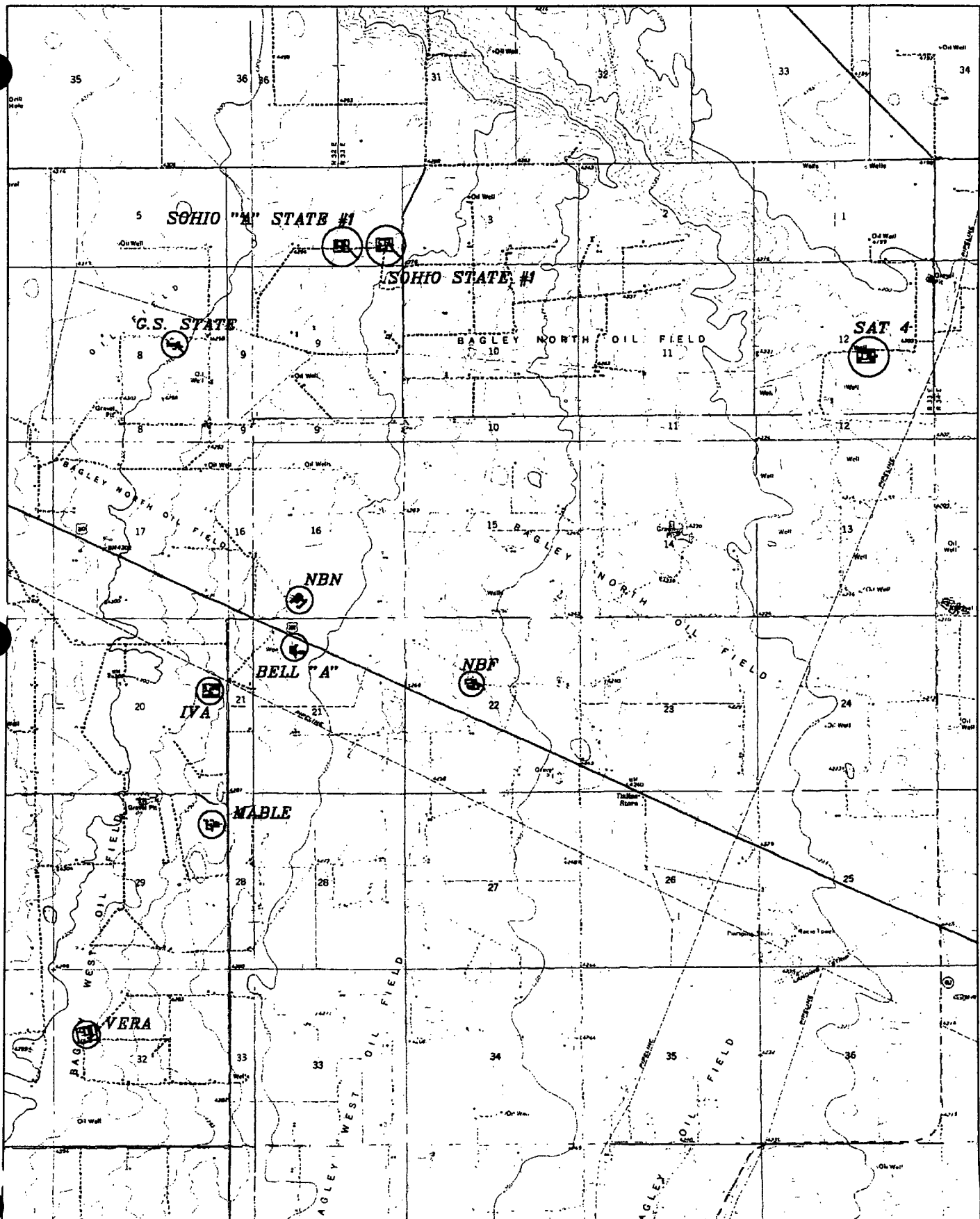
ST COORDINATES

	PT#	NORTH	EAST	ELEV
SOHIO A STATE 1 PIT	253	870084.293	760084.206	4286.84
SOHIO A STATE 1 MW11	254	869981.125	760134.902	4285.88
SOHIO A STATE 1 MW19	255	869974.033	760205.397	4285.97
SOHIO A STATE 1 MW28	256	869892.771	760255.240	4285.61
SOHIO A STATE 1 MW31	257	869667.200	760452.460	4283.54
SOHIO STATE 1 PIT	258	870105.632	761381.498	4285.42
SOHIO STATE 1 MW10	259	870027.049	761459.334	4283.63
SOHIO STATE 1 MW17	260	869969.168	761443.837	4283.31
SOHIO STATE 1 MW18	261	870017.865	761533.683	4283.59
SOHIO STATE 1 MW28	262	869892.594	761534.416	4283.21
SOHIO STATE 1 MW30	263	869677.360	761728.469	4281.13
VERA 1 PIT	264	846366.089	752525.766	4289.49
VERA #1 MW5	265	846217.026	752582.067	4298.90
STATE NBF 1 PIT	266	856893.939	764024.682	4266.86
STATE NBF 1 MW8	267	856806.388	764165.403	4259.41
STATE NBF 1 MW15	268	856747.667	764157.788	4259.68
STATE NBF 1 MW16	269	856774.041	764241.604	4259.06
STATE NBF 1 MW26	270	856658.728	764331.675	4258.04
BELL A 1 PIT	271	857796.692	758625.535	4279.64
BELL A 1 MW6	272	857857.556	758583.503	4281.12
BELL A 1 MW13	273	857754.617	758597.054	4280.84
BELL A 1 MW14	274	857821.944	758664.690	4280.80
BELL A 1 MW25	275	857614.080	758714.518	4280.37
GS STATE 1 SOURCE	276	867037.530	755087.975	4307.00
GS STATE 1 MW21	277	866953.249	755213.712	4303.08
GS STATE 1 MW22	278	866905.186	755154.733	4302.77
GS STATE 1 MW29	279	866798.038	755260.271	4303.20
GS STATE 1 MW?	280	867001.862	755131.639	4303.27
MABEL COM 1 SOURCE	281	852659.555	756329.277	4290.55
MABEL COM 1 MW3	282	852517.536	756370.356	4287.22
MABEL COM 1 MW4	283	852592.288	756473.774	4287.46
STATE NBN 1 PIT	284	859499.318	758793.854	4282.45
STATE NBN 1 MW7	285	859397.517	758825.203	4281.59
SATELLITE 4 MW9	286	866587.512	775890.421	4208.66
SATELLITE 4 MW23	287	866507.846	775901.105	4209.03
SATELLITE 4 MW24	288	866562.481	775964.699	4208.64
IVA COM 1 SOURCE	289	856721.216	756252.189	4298.42
IVA COM 1 MW1	290	856654.035	756344.507	4292.10
IVA COM 1 MW2	291	856695.146	756388.036	4291.93

HORIZONTAL DATUM NAD 83

VERTICAL DATUM NAVD 88

WHOLE EARTH ENVIRONMENTAL, INC.



4000 0 4000 8000

BASIN SURVEYS P.O. BOX 1786-HOBBS, NEW MEXICO

W.O. Number: 9352

Drawn By: K. GOAD

Date: 10-21-99

Disk: KJG #122 - WE9352.DWG

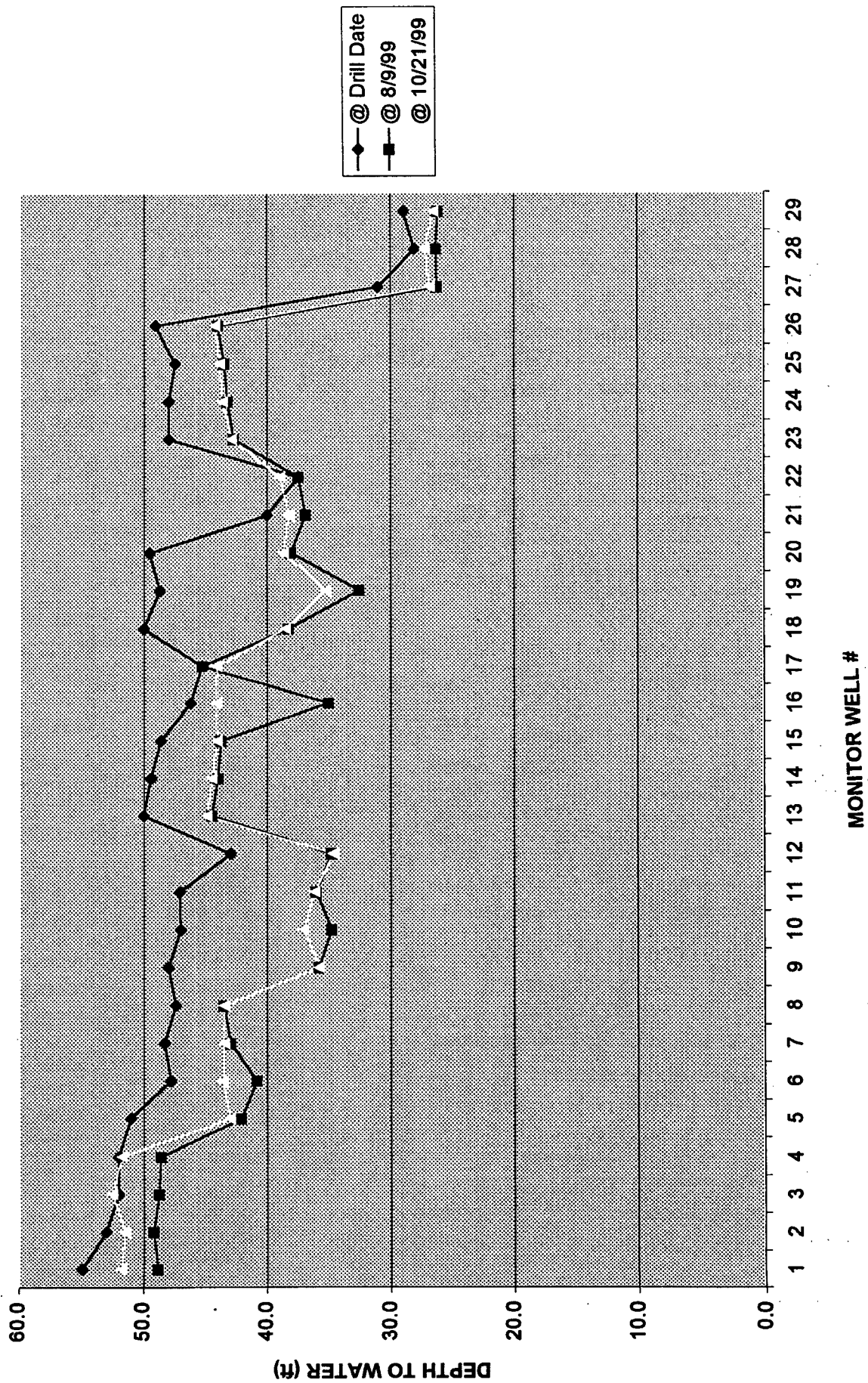


Tipperary Corporation
Tatum Pit Closure Project
Monitor Well Water Elevation Table

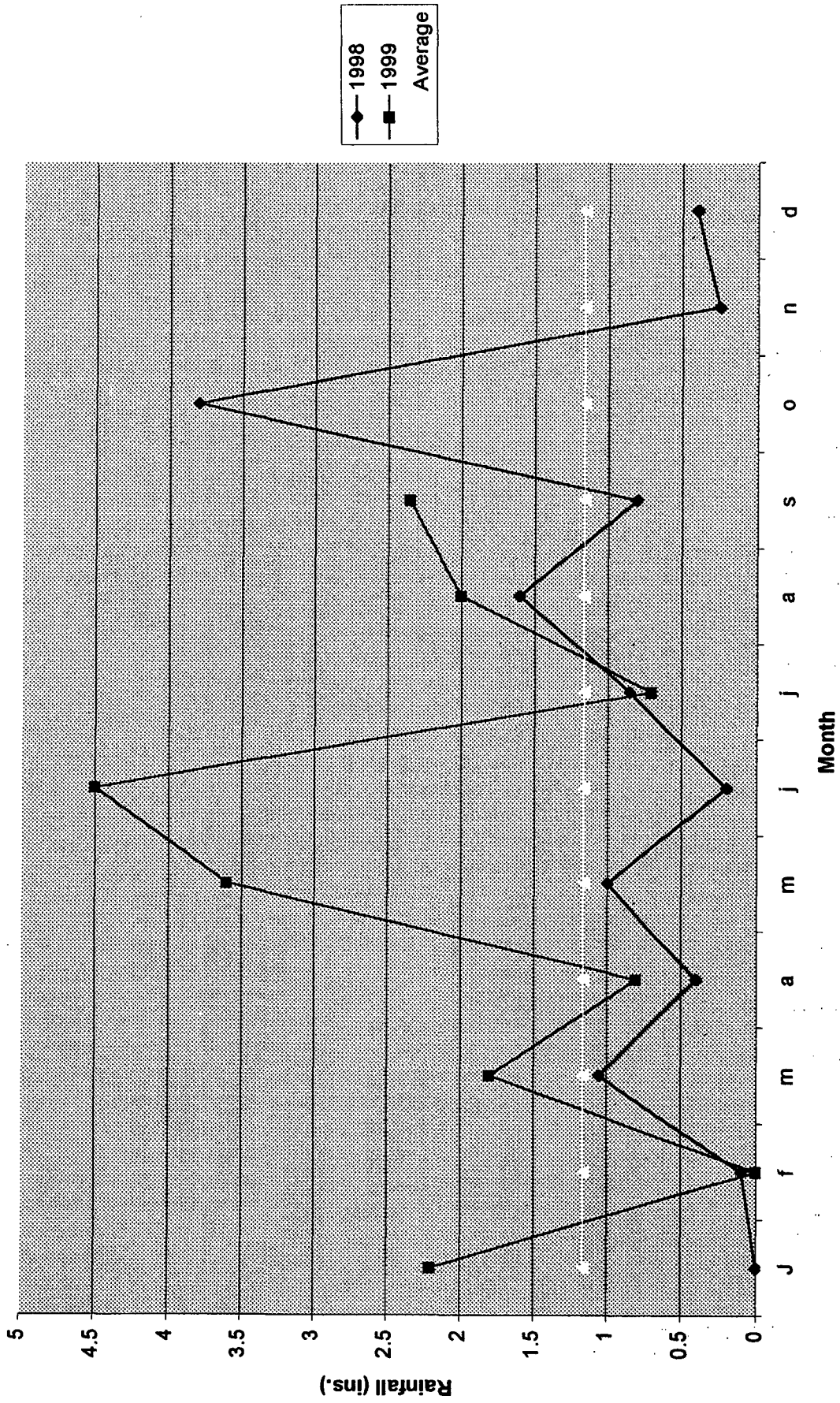
Well Name	Monitor Well No.	Surface Elevation	Date Well Drilled	Water Depth @ Drill Date	Water Elevation @ 8/8/88	Water Depth @ 8/8/88	Water Elev. @ 10/21/88	Water Depth @ 10/21/88	Water Elev. @ 10/21/88	Depth Change Aug. / Oct. '88	Distance to Pit Center (ft)	Gradient (ft. / ft.)	Gradient (ft. / 100 ft.)
Mable	Recovery Well 1	4,298.42	Aug-97	52.0	4,248.42	48.83	4,243.21	51.78	4,240.35	2.92	118	0.08074	8.02
	2	4,292.10	Aug-97	54.0	4,237.20	48.17	4,242.76	51.80	4,240.43	2.33	140	0.08380	8.38
Mable	Recovery Well 3	4,290.55	Aug-97	52.0	4,238.55	48.75	4,238.47	52.80	4,234.72	3.75	148	0.07250	2.25
	4	4,287.46	Aug-97	52.0	4,235.46	48.58	4,238.88	51.75	4,235.71	3.17	160	0.08313	1.93
Vern	Pit Center 5	4,292.98	Aug-97	53.0	4,289.50	61.50	4,237.40				159	-0.03723	-3.72
Bell	Pit Center 6	4,283.09	Aug-97	51.0	4,230.12	42.13	4,238.98	43.01	4,238.11	0.88	93	0.02183	2.12
	13	4,280.84	Oct-97	47.8	4,233.04	40.83	4,240.01	43.66	4,237.18	2.83	81	0.04418	4.41
NBN	14	4,280.80	Oct-97	48.3	4,232.80	43.00	4,237.80	43.50	4,237.30	0.50	47	0.04873	4.87
	26	4,280.37	Mar-98	47.4	4,232.97	43.50	4,238.87	43.60	4,238.87	0.00	154	0.01780	1.77
NBN	Pit Center 7	4,282.45	Aug-97	50.0	4,282.45	43.50	4,238.08				107	0.08037	0.80
NBP	Pit Center 8	4,281.59	Aug-97	50.0	4,231.59	36.75	4,223.86	36.75	4,223.86	0.00	165	0.04512	4.52
	16	4,259.41	Aug-97	48.0	4,211.41	34.75	4,224.83	37.00	4,222.88	2.25	198	0.03628	3.63
Solito #1	18	4,259.88	Oct-97	47.0	4,212.88	38.00	4,223.08	38.10	4,222.98	0.10	247	0.03179	3.16
	26	4,258.04	Mar-98	43.0	4,215.04	34.76	4,223.28	34.80	4,223.44	-0.15	367	0.02779	2.28
Solito #1	Pit Center 10	4,283.83	Aug-97	50.0	4,233.83	44.50	4,239.13	44.90	4,239.73	0.40	110	0.01673	1.63
	17	4,283.31	Oct-97	49.4	4,233.91	44.00	4,239.31	44.50	4,238.81	0.50	262	0.08053	0.81
Solito "A"	18	4,283.59	Oct-97	48.6	4,234.99	43.76	4,239.84	44.10	4,239.48	0.35	176	0.01038	1.04
	26	4,283.21	Mar-98	46.3	4,236.96	36.00	4,246.21	44.15	4,239.06	9.15	552	0.00400	0.40
Solito "A"	30	4,281.13	Aug-98	45.3	4,235.82	45.31	4,235.82	44.10	4,237.03	-1.21	778	0.00528	0.55
	Pit Center 11	4,285.84	Aug-97	50.0	4,285.84	38.26	4,247.83	38.50	4,247.38	0.26	118	0.08348	0.83
Solito "A"	19	4,285.97	Aug-97	48.7	4,237.27	32.50	4,253.47	35.15	4,250.82	2.65	164	0.00505	0.53
	20	4,285.98	Aug-97	48.5	4,238.48	38.00	4,247.56	38.06	4,247.30	0.66	151	0.00528	0.58
Solito "A"	27	4,285.61	Mar-98	40.0	4,245.61	38.83	4,248.78	38.20	4,247.41	1.37	284	0.00459	0.47
	31	4,283.84	Aug-98	37.6	4,246.09	37.46	4,246.09	38.90	4,244.84	1.45	624	0.00528	0.53
Solito "A"	Source Well 12	4,307.00	Aug-97	48.0	4,269.00	42.75	4,280.52	42.90	4,280.37	0.16	52	0.07173	7.17
	21	4,303.08	Oct-97	48.0	4,266.08	43.25	4,289.83	43.66	4,289.42	0.41	151	0.02580	2.60
Solito "A"	22	4,302.77	Oct-97	47.6	4,266.27	43.50	4,266.27	43.90	4,266.87	0.40	148	0.02820	2.52
	26	4,303.20	Mar-98	49.1	4,264.14	44.00	4,269.20	44.25	4,268.95	0.25	285	0.01647	1.65
Solito "A"	Pit Center 9	4,211.49	Aug-97	31.0	4,177.68	28.17	4,182.49	28.75	4,181.91	0.58	80	0.03378	3.64
	23	4,209.03	Oct-97	28.0	4,181.03	26.26	4,182.78	27.15	4,181.88	0.90	168	0.01570	1.66
Solito #4	24	4,208.84	Oct-97	28.9	4,179.74	28.08	4,182.58	28.46	4,182.18	0.37	160	0.01900	1.90

Note: Vern, Bell and Solito #4 had significant subsidence within the pit area.
The red elevations include an added 3.48' (Ave. of seven other elevs)
Correct elevations noted in column 6.

Tipperary Corporation Monitor Well Depths



Monthly Rainfall Totals



Le County Electric Co-Op Inc.
 18 W. Washington; P.O. Dr. 1447
 Lovington, N.M. 88260

Weather Report 1998

L=Lightning
 W=Wind 35mph+
 F=Fog
 I=Ice
 R=Rain
 S=Snow

January				February				March				April				May				June			
Day	Hi	Lo	Wth	Day	Hi	Lo	Wth	Day	Hi	Lo	Wth	Day	Hi	Lo	Wth	Day	Hi	Lo	Wth	Day	Hi	Lo	Wth
1	59	26		1	57	20		1	51	12		1	74	21	W	1	87	48		1	103	52	
2	74	26		2	64	15		2	53	10		2	61	44	W	2	89	46		2	106	56	
3	64	31		3	59	28		3	68	23		3	69	34		3	83	47		3	104	62	
4	57	36		4	33	25	F	4	78	33		4	73	30		4	90	47		4	92	65	
5	56	29		5	45	31		5	62	29		5	78	32		5	87	50		5	83	54	
6	50	24		6	52	28		6	61	32	.05L	6	70	37	W	6	87	52		6	76	48	
7	48	26		7	61	23		7	58	33	S&W	7	68	32	W	7	84	46		7	79	56	
8	56	22		8	67	33		8	41	16	W	8	66	36		8	88	47	W	8	91	62	
9	59	22		9	63	31		9	47	10		9	72	24		9	83	45		9	95	54	
10	59	17	F	10	55	27	W	10	48	13		10	78	27		10	88	41		10	82	64	.2R
11	61	26		11	55	17		11	44	15		11	79	38	W	11	89	51	W	11	86	51	
12	64	22		12	52	21	W	12	49	14		12	78	42	W	12	89	51		12	94	58	
13	50	25		13	61	15		13	67	22	F	13	76	35		13	93	48		13	97	65	
14	53	28		14	64	36		14	67	36		14	79	47		14	87	57	W	14	94	56	
15	57	15		15	64	42	L&W.1	15	61	44	.5R&W	15	74	33		15	81	46	W	15	88	54	
16	58	32		16	56	30	W	16	40	36		16	65	26		16	91	38		16	99	64	
17	66	29		17	56	24		17	56	32	.5L	17	56	28	.4R	17	97	60		17	99	64	
18	61	30		18	54	31	W	18	68	34	W	18	66	26		18	94	62	W	18	98	58	
19	64	27		19	56	29		19	54	26	W	19	70	27		19	97	63	RLW	19	102	53	
20	66	36		20	58	25		20	78	20		20	69	39		20	99	55		20	104	65	
21	46	31		21	53	37		21	76	40		21	69	27		21	92	59		21	104	59	
22	52	15		22	67	26		22	70	42		22	75	31		22	85	68		22	103	67	
23	55	26		23	71	28		23	66	38		23	86	38		23	91	61		23	102	66	
24	60	23		24	77	30	W	24	64	44		24	88	53	W	24	93	48		24	104	70	
25	64	24		25	61	39	W	25	75	39		25	81	48		25	89	53		25	106	70	
26	61	20		26	50	28	W	26	70	42	W	26	72	42	W	26	86	51	1RL	26	107	68	
27	70	21		27	50	20		27	73	44	W	27	59	35		27	91	54		27	109	68	
28	69	30		28	55	25		28	77	39	W	28	65	32		28	97	59		28	107	68	
29	62	17		29				29	78	40	W	29	73	31		29	98	58		29	99	68	
30	68	28		30				30	57	33	W	30	82	36		30	98	62		30	96	67	
31	63	27		31				31	63	30		31				31	99	60		31			
H/L	74	15		H/L	77	15	.1"	H/L	78	10	1.05"	H/L	88	21	.4"	H/L	99	38	1	H/L	109	48	.2"

Le... Junty Electric Co-Op Inc.
 16 W. Washington; P.O. Dr. 1447
 Lovington, N.M. 88260

Weather Report 1998

L=Lightning I=Ice
 W=Wind 35mph+ R=Rain
 F=Fog S=Snow

July				August				September				October				November				December			
Day	Hi	Lo	Wth	Day	Hi	Lo	Wth	Day	Hi	Lo	Wth	Day	Hi	Lo	Wth	Day	Hi	Lo	Wth	Day	Hi	Lo	Wth
1	94	67		1	96	65	L	1	90	58		1	94	54		1	55	36		1	65	29	
2	91	68		2	98	69		2	90	57		2	86	60	.1 L	2	60	34		2	70	40	
3	93	58		3	95	69		3	91	59		3	87	46		3	45	36	F	3	56	44	.4 L
4	96	66		4	82	59	W	4	92	59		4	86	61	W	4	42	37	F	4	70	34	
5	100	68	L	5	77	61	.1 L & W	5	92	62		5	72	52		5	39	36	F	5	70	36	
6	101	68	.15 L	6	86	56		6	90	60		6	70	32		6	42	35	F	6	70	36	
7	100	68		7	92	55		7	88	62		7	72	32		7	63	36	F	7	52	26	
8	100	67		8	95	64		8	92	59		8	76	46		8	69	37		8	44	12	
9	97	63		9	95	68		9	90	58	.5 L	9	86	44		9	71	39	F & W	9	44	20	
10	100	63		10	95	65		10	82	61	.3 L	10	89	44		10	53	27	W	10	48	30	S
11	104	69		11	96	65		11	92	54		11	92	44		11	65	24		11	44	26	
12	108	70		12	88	66	.1 L	12	84	56		12	78	49		12	58	31		12	54	14	
13	100	63	L	13	79	60	.75 L	13	91	56		13	87	44		13	56	38		13	60	20	
14	102	62	L	14	85	58		14	90	60		14	85	52		14	71	32		14	60	17	
15	99	64	L	15	90	57		15	83	61		15	86	52		15	70	29		15	54	17	
16	92	64	L	16	91	62		16	83	56		16	84	57		16	72	35		16	65	18	
17	94	62	L	17	89	59	F	17	84	54		17	74	42		17	71	29		17	52	20	
18	95	61	.6 RL	18	88	62	F	18	86	57		18	68	32		18	79	43		18	64	36	RFW
19	96	64		19	84	66	F	19	93	60		19	70	40		19	73	37		19	42	25	F
20	96	71		20	82	65		20	98	61		20	44	43	0.3	20	45	30		20	62	33	F
21	94	68	.1 RL	21	88	62	F	21	94	64		21	50	42	0.6	21	64	30		21	49	34	
22	95	60		22	89	59		22	84	57		22	57	45		22	75	33		22	20	2	
23	93	62		23	89	59		23	84	52		23	59	46		23	69	38		23	28	6	
24	95	63	L	24	91	58		24	92	63		24	70	41		24	74	25		24	36	12	
25	96	82		25	86	63		25	68	63		25	76	44		25	68	34		25	56	14	
26	96	65	L	26	89	65		26	94	62		26	74	55		26	74	28		26	62	18	
27	92	66	L	27	93	66		27	94	65		27	63	57	.9 L	27	75	35		27	59	40	W
28	95	63		28	81	63	.65" L	28	87	57		28	70	46		28	77	42		28	53	24	W
29	99	67		29	86	62		29	90	56		29	74	38		29	62	40		29	51	27	
30	102	68	L	30	90	56		30	92	58		30	73	53	1.8 LW	30	62	36	0.25	30	68	26	
31	95	61	L	31	90	57		31				31	60	48	.1 L	31				31	45	27	
H/L	109	58	.85"	H/L	98	55	1.0"	H/L	98	52	.8"	H/L	94	32	3.8"	H/L	79	24	.25"	H/L	70	2	.4

Lee County Electric Co-Op Inc.
1800 Washington; P.O. Dr. 1447
Lovington, N.M. 88260

Weather Report 1999
L=Lightning I=Ice
W=Wind 35mph+ R=Rain
F=Fog S=Snow

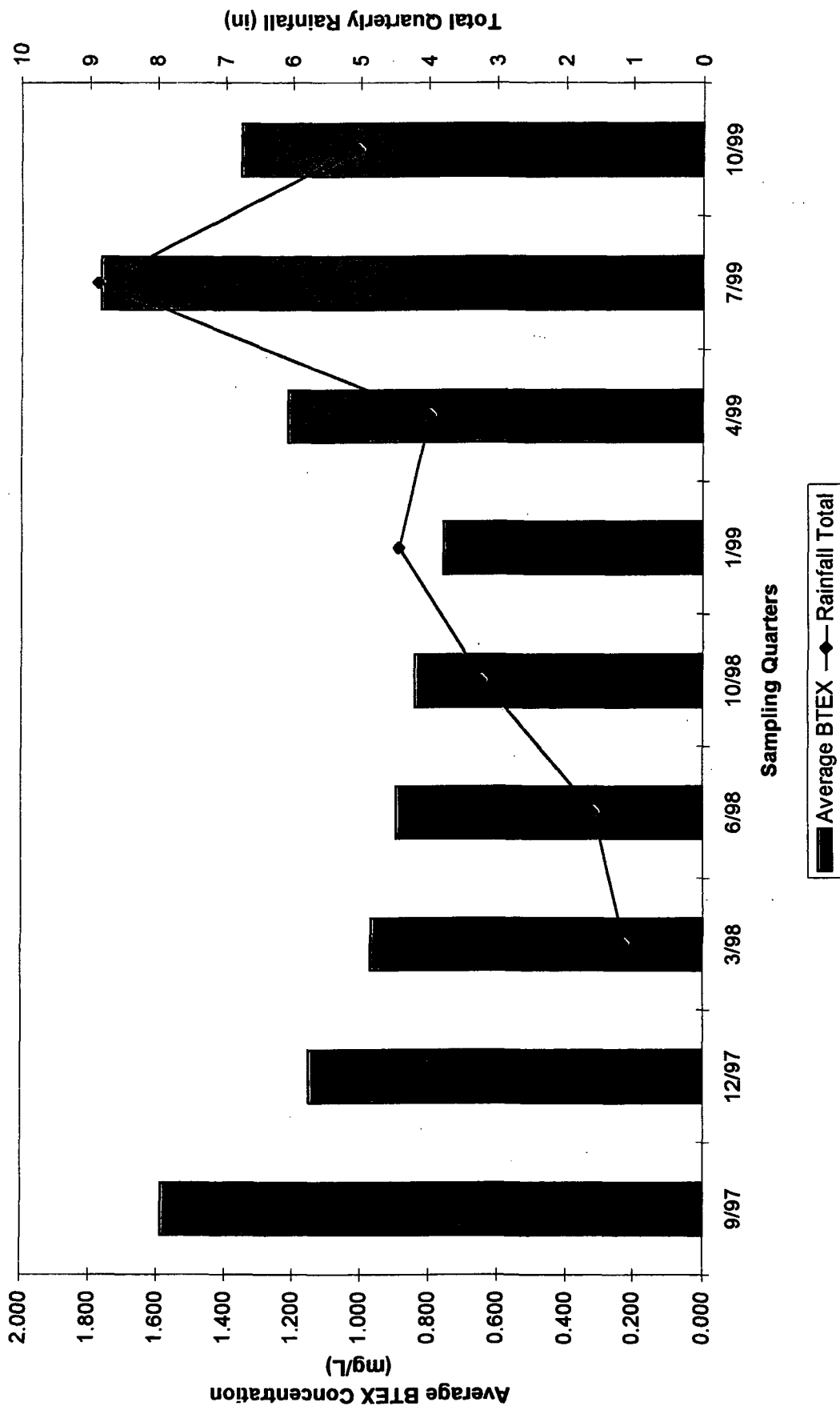
January				February				March				April				May				June			
Day	Hi	Lo	Wth	Day	Hi	Lo	Wth	Day	Hi	Lo	Wth	Day	Hi	Lo	Wth	Day	Hi	Lo	Wth	Day	Hi	Lo	Wth
1	57	32	F	1	60	30		1	76	37		1	72	42	W	1	71	47	0.2	1	88	56	
2	35	19		2	53	27		2	67	43		2	76	39	W	2	75	35		2	90	62	0.7L,R
3	31	10		3	67	32	W	3	60	20		3	59	32	W	3	78	45		3	88	65	F
4	43	5		4	60	26	W	4	75	34		4	74	34	W	4	73	45		4	89	54	
5	66	22		5	74	38		5	72	44		5	67	34	W	5	66	43		5	84	57	
6	64	25		6	63	35		6	53	32		6	78	47	W	6	66	31		6	89	50	
7	68	23		7	70	31		7	39	34	2" F,L	7	84	54		7	80	32		7	90	56	
8	68	27	W	8	73	39		8	62	33		8	75	55		8	90	52		8	91	68	
9	67	28		9	73	40		9	68	29		9	79	43		9	88	55		9	88	58	
10	65	28		10	78	34	W	10	77	34		10	73	37		10	85	52		10	93	56	
11	66	33		11	47	15	W	11	40	32	F	11	67	36		11	78	43		11	87	59	
12	69	35	W	12	40	10		12	52	31	F	12	72	44		12	76	42		12	79	52	
13	70	36		13	60	14		13	47	19	W	13	79	55	W	13	90	49		13	63	51	1.3R,L
14	69	34		14	53	22		14	63	23		14	76	48	W	14	93	52		14	72	55	0.1
15	70	29		15	73	31	W	15	79	40		15	84	30		15	91	53		15	78	50	
16	63	30		16	57	23		16	62	39	.8"	16	83	31		16	91	59		16	81	54	
17	68	28		17	67	30		17	70	31		17	87	51		17	78	53		17	76	51	
18	66	23		18	62	26		18	35	33		18	90	52		18	81	45		18	82	60	
19	74	35		19	70	27		19	48	28		19	96	54		19	85	48		19	83	60	L
20	73	33	W	20	57	30		20	64	25		20	96	54		20	91	52		20	79	56	1.6L
21	61	35	LW	21	69	23		21	70	33		21	91	55		21	86	53	L	21	80	62	
22	43	25	1R,1SW	22	65	36		22	74	29		22	92	59		22	87	51	L,W	22	85	58	.6L
23	63	23		23	65	23		23	78	33		23	64	49		23	86	53	.3RLW	23	91	59	
24	78	41		24	75	27		24	73	31		24	44	37		24	82	55	.9RLW	24	84	62	.2L
25	72	35		25	76	30		25	60	41		25	73	41	0.2	25	66	52	LW	25	86	55	
26	68	31	W	26	74	45		26	52	46	.8" FL	26	76	35		26	68	50	F	26	96	64	
27	67	29		27	64	31		27	62	37	FL	27	83	45		27	72	50	F	27	99	65	
28	43	27	1RFLSW	28	75	36		28	59	47	F	28	86	43	W	28	86	51	.5RL	28	100	69	
29	48	24	1SFLW	29				29	56	42	F	29	60	52	W	29	90	60	1.7RL	29	93	66	
30	42	23		30				30	66	43	F	30	63	56	.6LW	30	88	58		30	103	67	
31	55	24		31				31	77	46		31				31	87	52		31			
H/L	78	51.181.1R		H/L	78	10		H/L	79	19	1.8	H/L	96	30	0.8	H/L	93	31	3.8	H/L	103	50	4.5

1969
 15
 Lovington, N.M. 88260
 Washington; P.O. Dr. 1447

weather report 1969
 L=Lightning
 W=Wind 35mph+
 F=Fog
 S=Snow
 I=Ice
 R=Rain

July				August				September				October				November				December			
Day	Hi	Lo	Wth	Day	Hi	Lo	Wth	Day	Hi	Lo	Wth	Day	Hi	Lo	Wth	Day	Hi	Lo	Wth	Day	Hi	Lo	Wth
1	99	66		1	89	62		1	92	62		1	86	46		1				1			
2	96	71		2	80	62	3"R	2	89	60	1"RL	2	72	42		2				2			
3	92	68		3	84	65	5"R	3	89	61		3	91	44		3				3			
4	87	64		4	85	62		4	92	58	3"RL	4	72	43		4				4			
5	88	61		5	83	60	1.1"R	5	80	59		5	86	40		5				5			
6	89	63		6	88	62		6	83	56		6	84	51		6				6			
7	91	58		7	92	62		7	88	59	2"RL	7	84	58		7				7			
8	95	63		8	92	65		8	82	63		8	67	44		8				8			
9	95	68	L	9	92	60		9	82	58		9	77	38		9				9			
10	96	60	5"R	10	96	66		10	90	56		10	84	36		10				10			
11	76	53		11	96	65		11	96	59		11	80	37		11				11			
12	82	50		12	97	60		12	82	58		12	83	40		12				12			
13	89	53		13	98	60		13	74	52		13	86	41		13				13			
14	93	52	2"LAW	14	95	64		14	82	53		14	82	39		14				14			
15	88	67		15	95	61		15	78	57	2"RL	15		50		15				15			
16	88	65		16	96	58		16	70	54	8"RL	16				16				16			
17	87	64		17	96	61		17	76	53	15"RL	17				17				17			
18	89	60		18	93	61		18	81	52		18				18				18			
19	88	59		19	93	57		19	89	52		19				19				19			
20	90	60		20	95	64		20	74	52	F	20				20				20			
21	91	61		21	99	61		21	66	48		21				21				21			
22	93	63		22	97	60		22	76	42		22				22				22			
23	95	61		23	93	62	1"R	23	84	49		23				23				23			
24	99	66		24	85	61		24	89	54		24				24				24			
25	98	66		25	88	60		25	90	52		25				25				25			
26	94	60		26	91	60		26	93	56		26				26				26			
27	92	63		27	93	60		27	78	50		27				27				27			
28	94	60		28	97	59		28	58	41		28				28				28			
29	98	66		29	95	59		29	65	29		29				29				29			
30	97	66		30	95	56		30	81	39		30				30				30			
31	89	70	L	31	94	55		31				31				31				31			
H/L	99	50		H/L	99	55		H/L	96	29		H/L	91	38		H/L	0	0		H/L	0	0	

Comparison of Average BTEX
and Total Rainfall





Tipperary Corporation
Tatum Pit Closure Project
Quarterly Sampling Comparison

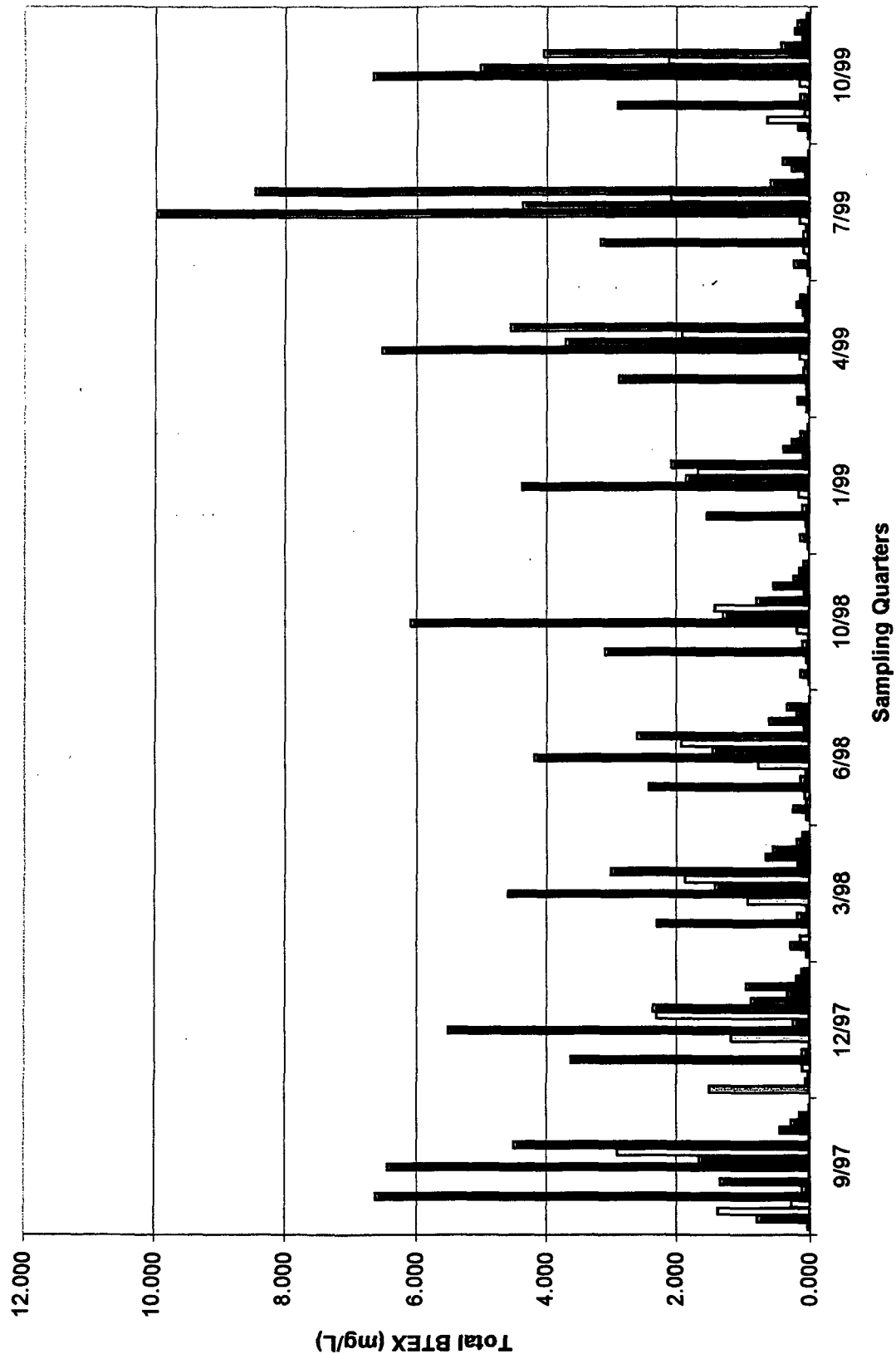
Well #	9/5/97	12/3/97	3/23/98	6/25/98	10/1/98	1/6/99	4/1/99	7/14/99	10/5/99
4	0.031	1.501	0.047	0.049	0.013	0.019	0.038	0.034	0.025
6	0.790	0.068	0.281	0.249	0.141	0.137	0.175	0.232	0.175
8	1.377	0.023	0.146	0.058	0.018	0.036	0.042	0.028	0.634
9	0.285	0.123	0.007	0.081	0.050	0.049	0.042	0.090	0.080
10	6.626	3.626	2.292	2.423	3.096	1.532	2.878	3.172	2.913
11	0.122	0.124	0.184	0.141	0.108	0.105	0.084	0.091	0.143
13	1.346	0.010	0.037	0.056	0.017	0.007	0.057	0.045	0.007
14	0.005	1.183	0.918	0.764	0.184	0.161	0.141	0.146	0.155
15	6.432	5.499	4.588	4.189	6.086	4.380	6.506	9.972	6.665
16	1.662	0.256	1.419	1.446	1.287	1.845	3.709	4.379	5.016
17	2.908	2.305	1.863	1.920	1.419	1.665	1.907	2.083	2.125
18	4.498	2.361	3.013	2.601	0.786	2.072	4.544	8.472	4.060
19	0.011	0.875	0.184	0.079	0.082	0.094	0.068	0.579	0.432
20	0.454	0.345	0.658	0.604	0.539	0.390	0.100	0.065	0.110
21	0.287	0.953	0.554	0.198	0.238	0.259	0.193	0.272	0.227
22	0.152	0.200	0.195	0.344	0.144	0.134	0.141	0.396	0.184
23	0.009	0.122	0.106	0.008	0.078	0.014	0.014	0.018	0.051
	26.995	19.574	16.492	15.210	14.286	12.899	20.639	30.074	23.002

Total BTEX (mg/L)

Sampling Quarters

Legend:

- MW 4
- MW 6
- MW 8
- MW 9
- MW 9
- MW 11
- MW 13
- MW 14
- MW 15
- MW 16
- MW 17
- MW 18
- MW 19
- MW 20
- MW 21
- MW 22
- MW 23



ENVIRONMENTAL LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

TIPPERARY
ATTN: MR. VICTOR A. VICE
P.O. BOX 857
TATUM, NM 88267
FAX: 505-398-6510
FAX: 281-646-8996


Sample Type: Water
Sample Condition: Intact/Iced
Project #: None Given
Project Name: None Given
Project Location: None Given

Sampling Date: 10/05/99
Receiving Date: 10/06/99
Analysis Date: 10/6-10/8/99

ELT#	FIELD CODE	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYLBENZENE (mg/L)	m,p-XYLENE (mg/L)	o-XYLENE (mg/L)
20597	Iva Com #1 SAW	0.001	<0.001	<0.001	<0.001	0.001
20598	Mable Com #3 SAW	0.003	0.021	0.010	0.038	0.020
20599	Bell A M/W #6	0.149	<0.001	0.015	0.008	0.002
20600	NBF M/W #8	0.160	0.214	0.036	0.143	0.081
20601	Sohio St #1 M/W	2.04	0.255	0.157	0.261	0.200
20602	Sohio Sta M/W #11	0.056	0.022	0.008	0.035	0.022
20603	GS State #M/W #21	0.116	0.018	0.053	0.027	0.015
20604	Satellite #9	0.034	0.008	0.009	0.019	0.010
20605	Iva Com SAW	1.67	1.80	0.126	1.42	1.03
20606	Iva Com #2	0.001	<0.001	<0.001	<0.001	<0.001
20607	Mable Com #4	0.002	0.005	0.002	0.010	0.006
20608	Mable Com # SAW	0.467	0.395	0.094	0.868	0.685
20609	Bell A M/W #13	0.003	<0.001	<0.001	0.001	<0.001
20610	Bell A M/W #14	0.109	0.005	0.004	0.024	0.013
20611	Bell A M/W #25	0.001	<0.001	<0.001	<0.001	<0.001
20612	NBF M/W #15	2.85	1.85	0.303	1.05	0.612
20613	NBF M/W #16	3.22	0.776	0.179	0.576	0.265
20614	NBF M/W #26	0.066	0.059	0.016	0.057	0.031
20615	Sohio St #1 M/W #17	1.150	0.206	0.289	0.304	0.176
20616	Sohio St #1 M/W #18	2.47	0.486	0.066	0.594	0.444
20617	Sohio St #1 M/W #28	0.192	0.042	0.070	<0.001	0.034
20618	Sohio St #1 M/W #30	0.188	0.087	0.023	0.081	0.050

% IA	98	92	94	96	95
% EA	91	90	87	86	88
BLANK	<0.001	<0.001	<0.001	<0.001	<0.001

METHODS: SW 848-8020.5030


Raland K. Tuttle


Date

ENVIRONMENTAL LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

TIPPERARY
ATTN: MR. VICTOR A. VICE
P.O. BOX 857
TATUM, NM 88267
FAX: 505-398-6510
FAX: 281-646-8996


Sample Type: Water
Sample Condition: Intact/loose
Project #: None Given
Project Name: None Given
Project Location: None Given

Sampling Date: 10/05/99
Receiving Date: 10/06/99
Analysis Date: 10/8-10/8/99

ELT#	FIELD CODE	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYLBENZENE (mg/L)	m,p-XYLENE (mg/L)	o-XYLENE (mg/L)
20619	Sohio Sta M/W #19	0.346	0.020	0.008	0.038	0.020
20620	Sohio Sta M/W #20	0.023	0.023	0.008	0.035	0.021
20621	Sohio Sta M/W #27	0.285	0.014	0.006	0.029	0.017
20622	Sohio Sta M/W #31	0.382	0.015	0.006	0.039	0.022
20623	GS State M/W #22	0.070	0.015	0.047	0.032	0.020
20624	GS State M/W #29	0.022	0.017	0.008	0.035	0.038
20625	GS State M/W #12	0.008	0.007	0.008	0.024	0.007
20626	Satellite #23	0.007	0.009	0.008	0.019	0.010
20627	Satellite #24	0.011	0.011	0.008	0.021	0.012

% IA	99	92	93	92	91
% EA	91	90	87	86	86
BLANK	<0.001	<0.001	<0.001	<0.001	<0.001

METHODS: SW 846-8020.5030


Randal K. Tuttle

10-12-99
Date

Environmental Lab of Texas, Inc. 12600 West 1-20 East Odessa, Texas 79763
 (915) 563-1800 FAX (915) 563-1713

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: V.R. Vice
Phone #: 565-398-6509
FAX #: 565-398-6510
Company Name & Address: MINE OPERATIONS 1-800-654-4358
Project Name: Whole Earth
Project Name:
Project Location:
Sampler Signatures:

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX							PRESERVATIVE METHOD				SAMPLING		DTX #020/5030	TPH 418.1	TCLP Metals Ag As	Total Metals Ag As	TCLP Volatiles	TCLP Semi Volatiles	TOS	RCI																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
				WATER	SOIL	AIR	SLUDGE	OTHER	ICL	INOS	ICE	NONE	OTHER	DATE	TIME																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
0597	TVA Com # 1 #2 S/W	2											X				10/5/99																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									

ANALYSIS REQUEST

TCLP Metals Ag As Ba Cd Cr Pb Hg Se
 TCLP Volatiles
 TCLP Semi Volatiles
 TOS
 RCI

TPH 418.1
 DTEX 8020/5030

REMARKS

Received by: _____ Date: _____

Received by: _____ Date: _____

Received by Laboratory: _____ Date: 10/6/99

Project Manager:

Phone #:

VA Vice

FAX #:

Sampling Name & Address:

Tipprary Oil & Gas Corp

Project #:

Project Name:

Project Location:

Sampler Signature:

ANALYSIS REQUEST

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX						PRESERVATIVE METHOD				SAMPLING	
				WATER	SOIL	AIR	SLUDGE	OTHER	HCL	HNO3	ICE	NONE	OTHER	DATE	TIME
206006	Iva Cam #2	2	✓	✓										✓	10/5
206007	Mable Cam #4	1	✓	✓											
206008	Mable Cam # Source Well	1	✓	✓											
206009	Bell A MW #13	1	✓	✓											
206010	" " #14	1	✓	✓											
206011	" " #25	1	✓	✓											
206012	NBF MW #15	1	✓	✓											
206013	" " #16	1	✓	✓											
206014	" " #26	1	✓	✓											
206015	Schlo ST #1 MW #17	1	✓	✓											
206016	" " #18	1	✓	✓											

BTEX 8020/5030

TPH 418.1

TCLP Metals Ag As Ba Cd Cr Pb Hg Se

TCLP Volatiles

TCLP Semi Volatiles

TDS

RCI

REMARKS

Initiated by:	Date:	Time:	Received by:
Initiated by:	Date:	Time:	Received by:
Initiated by:	Date:	Time:	Received by Laboratory:

CHAIN-OF-CUSTODY RECORD AND ANALYSIS R

U. A. Vica

Company Name & Address

Tipperary Club Co

Prelog Name:

Summary of Experiments

DTX	8020/5030
TPI	418.1
TCLP Metals Ag As E	
Total Metals Ag As E	
TCLP Volatiles	
TCLP Semi Volatiles	
TDS	
RCl	

Received by:

REMARKS

Received by:

1

Received by Laboratory:

4

ENVIRONMENTAL LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

WHOLE EARTH ENVIRONMENTAL
ATTN: MR. MIKE GRIFFIN
19606 SAN GABRIEL
HOUSTON, TEXAS 77084
FAX: 1-281-646-8996

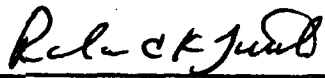
Sample Type: Water
Sample Condition: Intact/ Iced/ HCl
Project #: Tatum Step-Out
Project Name: None Given
Project Location: 13 Miles West Tatum, N.M.

Sampling Date: 08/11/99
Receiving Date: 08/13/99
Analysis Date: 08/13/99

ELT#	FIELD CODE	BENZENE mg/L	TOLUENE mg/L	ETHYLBENZENE mg/L	m,p-XYLENE mg/L	o-XYLENE mg/L
19185	MW-30	<0.001	<0.001	<0.001	0.001	<0.001
19188	MW-31	0.396	0.004	0.001	0.017	0.012

% IA	96	88	85	86	89
% EA	94	91	91	90	92
BLANK	<0.001	<0.001	<0.001	<0.001	<0.001

METHODS: SW 846-8020,5030


Randal K. Tuttle

8-16-99
Date

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Phone #: (800) 854-4358

FAX #: (781) 646-8996

Whole Earth Environment

Project Name:

Latency Step-out

Sampler Signature:

13 miles west Tatum NM.

Ad. H.

LAB #
LAB USE
ONLY

FIELD CODE

TRAINERS

Amount:

MATRIX	PRESERVATIVE METHOD	DATE	SAMPLING TIME
WATER			
SOIL			
AIR			
SLUDGE			
OTHER			
HCL			
NHNO ₃			
NONE			
OTHER			

5165 MW-30

1166 MW-31

24 pages

Date:

Fluor:

Received by:

REMARKS

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100%

Received by:

五、

Dates

Index

Received by Laboratory:

ENVIRONMENTAL LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"


TIPPERARY
ATTN: MR. VICTOR A VICE
P.O. BOX 857
TATUM, NM 88267
FAX: 505-398-6510
FAX: 281-846-8996 Mike Griffin

Sample Type: Water
Sample Condition: Intact/Iced
Project #: None Given
Project Name: None Given
Project Location: Tatum, New Mexico

Sampling Date: 07/14/99
Receiving Date: 07/15/99
Analysis Date: 07/16/99

ELT#	FIELD CODE	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYLBENZENE (mg/L)	m,p-XYLENE (mg/L)	o-XYLENE (mg/L)
18590	Iva Com Source Well	4.46	6.85	1.24	8.16	5.57
18591	Mable Com Source Well	0.568	0.376	0.068	1.23	0.908
18592	Mable Com #4 MW	0.008	0.006	0.002	0.012	0.008
18593	Bell A #6	0.177	0.010	0.020	0.015	0.010
18594	NBF #8	0.023	0.001	0.001	0.002	0.001
18595	Sohio St #1 - #10	2.34	0.110	0.243	0.343	0.136
18596	Sohio St #A #11	0.060	0.008	0.003	0.011	0.009
18597	GS St #21	0.140	0.010	0.044	0.062	0.016
18598	Satellite #4 - MW #9	0.010	0.004	0.009	0.020	0.007
18599	Bell A #13	0.011	0.011	0.005	0.012	0.006
18600	Bell A #14	0.132	0.005	0.002	0.005	0.002
18601	Bell A #25	0.012	0.010	0.002	0.008	0.004
18602	NBF #15	3.97	3.07	0.438	1.81	0.886
18603	NBF #16	3.64	0.116	0.151	0.343	0.129
18604	NBF #28	0.030	0.027	0.006	0.019	0.011
18605	Sohio St. #1 - #17	1.01	0.205	0.146	0.482	0.240
18606	Sohio St. #1 - #18	3.54	0.553	0.288	0.967	0.532
18607	Sohio St. #1 - #28	0.019	0.003	0.004	0.008	0.005
18608	Sohio St. A - #19	0.532	0.009	0.004	0.026	0.006
18609	Sohio St. A #20	0.023	0.010	0.006	0.018	0.010
18610	Sohio St. A #27	0.268	0.024	0.006	0.030	0.024
18811	GS St. #22	0.109	0.017	0.085	0.144	0.041
18612	GS St. #29	0.014	0.007	0.019	0.125	0.062
18613	Satellite #4 MW #23	0.003	0.002	0.002	0.008	0.003
% IA		98	93	91	91	93
% EA		98	93	91	90	93
BLANK		<0.001	<0.001	<0.001	<0.001	<0.001

METHODS: SW 848-8020,5030


Roland K. Tuttle

07-16-99
Date

ENVIRONMENTAL LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

TIPPERARY
ATTN: MR. VICTOR A. VICE
P.O. BOX 857
TATUM, NM 88287
FAX: 505-398-6510
FAX: 281-646-8996

Receiving Date: 04/02/99
Sample Type: Water
Project: None Given
Project Location: None Given

Analysis Date: 4/05 & 4/06/99
Sampling Date: 04/01/99
Sample Condition: Intact/loose

ELT#	FIELD CODE	BENZENE (mg/l)	TOLUENE (mg/l)	ETHYLBENZENE (mg/l)	m,p-XYLENE (mg/l)	o-XYLENE (mg/l)
17428	Iva Corn Source Well	2.05	4.15	0.902	5.50	3.80
17429	Mable Corn Source Well	0.486	0.432	0.066	1.00	0.713
17430	Mable Corn #4	0.012	0.008	0.002	0.010	0.006
17431	Bell A #6	0.139	0.013	0.006	0.011	0.006
17432	Bell A #13	0.021	0.018	0.003	0.009	0.006
17433	Bell A #14	0.108	0.015	0.004	0.009	0.005
17434	NBF #8	0.032	0.002	0.004	0.003	0.001
17435	NBF #15	3.11	1.98	0.214	0.767	0.435
17436	NBF #18	3.15	0.164	0.078	0.219	0.098
17437	Sohio St #1- #10	2.34	0.067	0.168	0.203	0.100
17438	Sohio St #1- #17	1.35	0.092	0.079	0.248	0.138
17439	Sohio St #1- #18	3.35	0.331	0.114	0.469	0.280
17440	Sohio St #1- #28	0.446	0.065	0.011	0.041	0.058
17441	Sohio St A - #11	0.048	0.008	0.004	0.014	0.010
17442	Sohio St A - #19	0.026	0.010	0.006	0.016	0.010
17443	Sohio St A - #20	0.547	0.011	0.005	0.030	0.009
17444	Sohio St A - #27	0.056	0.007	0.006	0.007	0.013
17445	G.S. State #21	0.124	0.008	0.042	0.012	0.007
17446	G.S. State #22	0.059	0.010	0.036	0.022	0.014
17447	G.S. State #29	0.004	<0.001	<0.001	0.035	<0.001
17448	Satellite #4 - #9	0.027	0.005	0.004	0.004	0.002
17449	Satellite #4 - #23	0.004	0.004	0.001	0.003	0.002
% IA		102	99	97	97	99
% EA		100	97	97	91	95
BLANK		<0.001	<0.001	<0.001	<0.001	<0.001

METHODS: SW 846-8020,5030


Ralanda K. Tuttle

4-7-99
Date

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Phone #: 505-398-6509

PLATE 1:

Mike Griffin

Project Name:

Sampler Storyteller

[illegible]

Responsible

REMARKS

1

Received by Laboratory:

Enviro Mental Lab of Texas, Inc. 12600 West I-20 • Dallas, Texas 79763
 (915) 563-1800 FAX (915) 563-1713

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager:

Phone #:

FAX #:

Company Name & Address:

Tipperary

Project #:

Project Name:

Project Location:

Sampler Signature:

ANALYSIS REQUEST

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX						PRESERVATIVE METHOD				SAMPLING		TIME	DATE	
				WATER	SOIL	AIR	SLUDGE	OTHER	HCL	HNO3	ICE	NONE	OTHER	TCLP Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Volatiles			TCLP Semi Volatiles
7431	BELA #6																	
7432	#13																	
7433	#14																	
7434	NBF #8																	
7435	#15																	
7436	#16																	
7437	Sohio St #1																	
7438	#17																	
7439	#18																	
7440	#28																	
7441	Sohio St #A																	

REMARKS

Requested by:	Date:	Time:	Received by:
	04-02-99	1010	
Requested by:	Date:	Time:	Received by:
Requested by:	Date:	Time:	Received by Laboratory:

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

EX-11

Tipperary

Project Name :

Sampler Signature:

[illegible]

REMARKS			
Requested by:	Date:	Times:	Received by:
Requested by:	Date: 04-02-99	Times: 1010	Received by:
Requested by:	Date:	Times:	Received by Laboratory:

ENVIRONMENTAL LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

TIPPERARY OIL & GAS
633 17TH
DENVER, COLORADO 80202
FAX: 281-646-8996 (Mike Griffin)

Receiving Date: 03/17/99
Sample Type: Water
Project: Tatum Dileneation
Project Location: Tatum, N.M.

Analysis Date: See below
Sampling Date: 3/17/99
Sample Condition: Intact/iced

ELT#	Field Code	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	CO3 (mg/L)	HCO3 (mg/L)
17265	#25 Bell	189	46	281	8.7	851	300	0	159
17266	#26 NBF	31.4	16	65	6.4	53	175	0	159
17267	#27 Sohio A	144	78	377	16.2	1028	195	0	329
17268	#28 Sohio #1	715	140	4660	20.8	8685	195	0	329
17269	#29 G.S. State	178	44	102	8.1	487	150	0	281

ANALYSIS DATE	3/24/99	3/24/99	3/24/99	3/24/99	3/18/99	3/18/99	3/18/99	3/18/99
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QUALITY CONTROL	53.9	5.1	55.9	5.2	5140	48	*	*
TRUE VALUE	50.0	5.0	50.0	5.0	5000	50	*	*
% PRECISION	108	102	111	104	103	96	*	*

METHODS: EPA 4.1.1, 215.1, 242.1, 273.1, 258.1, 325.3, 375.4, 310.2.


Raland K. Tuttle

3-26-99
Date

ENVIRONMENTAL LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

TIPPERARY OIL & GAS
633 17TH
DENVER, COLORADO 80202
FAX: 281-646-8996(Mike Griffin)

Receiving Date: 03/17/99
Sample Type: Water
Project: Tatum Dileneation
Project Location: Tatum, N.M.

Analysis Date: Hg 3/23/99
Analysis Date: 3/25/99
Sampling Date: 3/17/99
Sample Condition: Intact/Iced

TOTAL METALS (mg/L)


ELT#	Field Code	Ag	As	Ba	Cd	Cr	Hg	Pb	Se
17265	#25 Bell	ND	ND	0.250	ND	0.0110	ND	ND	ND
17266	#26 NBF	ND	ND	0.201	ND	0.0060	ND	ND	ND
17267	#27 Sohio A	ND	ND	0.276	ND	0.0110	ND	ND	ND
17268	#28 Sohio #1	ND	0.028	0.709	ND	0.0220	ND	0.0090	ND
17269	#29 G.S. State	ND	ND	0.369	ND	0.0080	ND	ND	ND

REPORTING LIMIT	0.0050	0.005	0.010	0.0010	0.0050	0.00020	0.0030	0.0050
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ND = Not detected at the reporting limit.

% INSTRUMENT ACCURACY	100	106	95	100	94	103	98	112
% EXTRACTION ACCURACY	96	104	97	100	96	96	99	102

METHODS: EPA 200.7, 245.2


Raland K. Tuttle

3-26-99
Date

ENVIRONMENTAL LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

TIPPERARY OIL & GAS
633 17TH
DENVER, COLORADO 80202
FAX: 281-646-8996 (Mike Griffin)

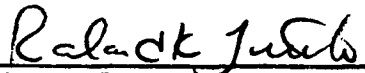
Receiving Date: 03/17/99
Sample Type: Water
Project: Tatum Dileneation
Project Location: Tatum, New Mexico

Analysis Date: 03/17/99
Sampling Date: 03/17/99
Sample Condition: Intact/Iced

ELT#	FIELD CODE	BENZENE (mg/l)	TOLUENE (mg/l)	ETHYLBENZENE (mg/l)	m,p-XYLENE (mg/l)	o-XYLENE (mg/l)
17265	#25 Bell	0.006	0.004	0.004	0.005	0.004
17266	#26 NBF	0.002	0.003	0.001	0.002	0.001
17267	#27 Sohio A	0.118	0.019	0.005	0.004	0.008
17268	#28 Sohio #1	0.156	0.008	0.003	0.010	0.005
17269	#29 G.S. State	0.012	0.012	0.004	0.021	0.041

% IA	104	100	99	98	99
% EA	108	104	101	102	103
BLANK	<0.001	<0.001	<0.001	<0.001	<0.001

METHODS: SW 846-8020.5030


Raland K. Tuttle

3-26-99
Date

ENVIRONMENTAL LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

TIPPERARY
ATTN: MR. VICTOR A. VICE
P.O. BOX 857
TATUM, NM 88267
FAX: 505-388-6510
FAX: 281-648-8988

Receiving Date: 01/08/99
Sample Type: Water
Project: None Given
Project Location: Tatum, New Mexico 88237

Analysis Date: 01/08/99
Sampling Date: 01/06 & 01/07/99
Sample Condition: Intact/leached/HCl

ELTW	FIELD CODE	BENZENE (mg/l)	TOLUENE (mg/l)	ETHYLBENZENE (mg/l)	m,p-XYLENE (mg/l)	o-XYLENE (mg/l)
16587	Sohio St. #1 - #17	0.876	0.138	0.084	0.338	0.163
16588	Sohio St. #1 - #18	1.10	0.247	0.107	0.415	0.203
16589	Sohio Sta. M/W #19	0.040	0.014	0.006	0.021	0.013
16590	Sohio St. M/W #20	0.341	0.010	0.005	0.028	0.008
16591	GS State M/W #21	0.133	0.010	0.064	0.058	0.006
16592	GS State M/W #22	0.039	0.010	0.020	0.048	0.017
16593	Sat. #4 M/W #23	0.004	0.003	0.001	0.004	0.002
16594	Sat. #4 M/W #24	0.004	0.003	<0.001	0.002	<0.001
16595	wa. Com. M/W #1	0.003	0.001	<0.001	0.002	0.004
16596	wa. Com. M/W #2	0.004	0.001	<0.001	0.003	0.001
16597	Mable Com. M/W #3	<0.001	0.002	0.012	0.042	0.016
16598	Mable Com. M/W #4	0.007	0.002	0.002	0.006	0.002
16599	Vera M/W #5	0.002	0.002	0.001	0.004	0.002
16600	Bell A M/W #6	0.127	0.001	0.003	0.006	0.001
16601	NBN M/W #7	0.003	<0.001	<0.001	0.002	<0.001
16602	NBF M/W #8	0.026	0.001	0.003	0.003	<0.001
16603	Sat. 4 M/W #9	0.034	0.003	0.006	0.006	0.001
16604	Sohio St. #1 M/W #10	1.00	0.067	0.158	0.214	0.085
16605	Sohio Sta. M/W #11	0.061	0.011	0.006	0.018	0.012
16606	Bell A M/W #12	0.001	<0.001	<0.001	0.003	0.001
16607	Bell A M/W #14	0.154	<0.001	0.002	0.003	0.001
16608	NBF M/W #15	1.63	1.49	0.182	0.728	0.350
16609	NBF M/W #16	1.47	0.122	0.047	0.144	0.082
% IA		86	86	87	85	87
% EA		90	90	89	88	90
BLANK		<0.001	<0.001	<0.001	<0.001	<0.001

METHODS: SW 846-8020, 5030

Ronald K. Tuttle
Ronald K. Tuttle

1-11-99
Date

Environmental Lab of Texas, Inc. 12600 West I-20 East Odessa, Texas 79763

(915) 563-1800 FAX (915) 563-1713

V.A. Vice 7. Whole Earth

Phone #: 1-800-864-4358

FAX #: 505-398-6507

TIPPERARY OIL & GAS

Company Name & Address

TATUM, N.MEX #88267

Project #:

Project Name:

M/W

Project Location

TATUM, N.MEX

Sample Signature

D.A. [Signature]

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX						PRESERVATIVE METHOD				SAMPLING	
				WATER	SOIL	AIR	SLUDGE	OTHER	HCL	HNO3	ICE	NONE	OTHER	DATE	TIME
16595	IYA Com. M/w #1 #3	2												7/6/99	
16596	Mable Com. #3 #4	2												7/6/99	
16597	VERA #10 #5	2												7/6/99	
16598	Bell A m/w #6	2												7/6/99	
16600	NBN M/w #7	2												7/6/99	
16601	NBF m/w #8	2												7/6/99	
16602	SATILITE #1 - m/w #9	2												7/6/99	
16603	SOLVOSTA1 - m/w #10	2												7/6/99	
16604	SOLVOSTA2 - m/w #11	2												7/6/99	
16605	Bell A m/w #13 #14	2												7/6/99	
16606	NBF m/w #15-16	2												7/6/99	

REMARKS

Received by:	0855	Received by:	9 mcmurry
Time:	0855	Time:	
Date:	01-08-99	Date:	
Received by:		Received by:	
Time:		Time:	
Date:		Date:	

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

ANALYSIS REQUEST

TCLP Metals Ag As Ba Cd Cr Pb Hg Se	
TCLP Metals Ag As Ba Cd Cr Pb Hg Se	
TCLP Volatiles	
TCLP Semi Volatiles	
TDS	
RCI	
BTEX 8420/5030	
TPH 418.1	

Environmental Lab of Texas, Inc. 12600 West 1-20 East Odessa, Texas 79763

(915) 563-1800 FAX (915) 563-1713

V.A. Vice - Whole Earth

Project Manager: 11506"-398-6509 OFF

Tiptonary Oil & Gas

Phone #: 1-800-854-4358

FAX #:

Company Name & Address

Tatum, New Mexico 88267

Project #:

Project Name:

Project Location

Sample Signature

Debra A. Vice

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

ANALYSIS REQUEST

TCLP Metals Ag As Ba Cd Cr Pb Hg Se	
Total Metals Ag As Ba Cd Cr Pb Hg Se	
TCLP Volatiles	
TCLP Semi Volatiles	
TDS	
RCI	
TPH 418.1	
BTEX 8020/5030	

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX				PRESERVATIVE METHOD				SAMPLING		
				WATER	SOIL	AIR	BLUDGE	OTHER	HCL	HNO3	ICE	NONE	OTHER	DATE
16387	Sohio ST#17-18	2											1/4/99	
16388	Sohio ST#19-20	2											1/4/99	
16389	GS STATE #11-32	2											1/4/99	
16390	SARL #2#4 #12 #3 #24	2											1/4/99	

REMARKS

Received by:	0855	01-08-99	0855
Received by:			
Received by Laboratory:			



QP-28

WHOLE EARTH ENVIRONMENTAL QUALITY PROCEDURE

Procedure for Developing Cased Water Monitoring Wells

Completed By: _____ Approved By: _____ Effective Date: / /

1.0 Purpose

This procedure outlines the methods to be employed to develop cased monitoring wells.

2.0 Scope

This procedure shall be used for developed, cased water monitoring wells. It is not to be used for standing water samples such as ponds or streams.

3.0 Preliminary

3.1 Prior to development, the static water level and height of the water column within the well casing will be measured with the use of an electric D.C. probe or a steel engineer's tape and water sensitive paste.

3.2 All measurements will be recorded within a field log notebook and subsequently reported within the driller's boring log report.

3.3 All equipment used to measure the static water level will be decontaminated after each use by means of Alconox, a phosphate free laboratory detergent, and water to reduce the possibility of cross-contamination. The volume of water in each well casing will be calculated.

4.0 Purging

4.1 Wells will be purged by removing a minimum of three well casing volumes by using a 2" decontaminated submersible pump or dedicated one liter Teflon bailer.

4.2 If a submersible is used the pump will be decontaminated prior to use by scrubbing the outside surface of tubing and wiring with an Alconox-water mixture, pumping an Alconox-water mixture through the pump, and a final flush with fresh water.

5.0 Water Disposal

5.1 All purge and decontamination water will be temporarily stored within a 60 gallon portable tank and then pumped into a permanent storage tank to be later disposed of in an appropriate manner.

6.0 Records

6.1 Whole Earth will record the amount of water removed from the well during development procedures. The purge volume will be reported to the appropriate regulatory authority when filing the closure report.



Calculation for Determining the Minimum Bailing Volume for Monitor Wells

$$\text{Formula } V = (\pi r^2 h)$$

V= volume

π = pi

r= inside radius of the well bore

h= maximum height of well bore in water table

π	r^2	h (in)	V (cu. in)	V (gal)	X 3 Volumes	Actual
3.1416	1	180	565.488	2.448	7.344	>10

Sohio 1



Sohio State # 1 1999 Activity Summary

Monitor Well # 10

This well also reflected the "summer spike" in BTEX concentrations and is now reflecting declining values as the water table subsides.

Monitor Well # 17

This well also reflected the "summer spike" in BTEX concentrations and is now reflecting declining values as the water table subsides.

Monitor Well # 18

This well also reflected the "summer spike" in BTEX concentrations and is now showing declining values as the water table subsides.

Monitor Well # 28

This lateral delineation well was drilled and completed in March 1999. We anticipate that the January 2000 sampling round will show lower results.

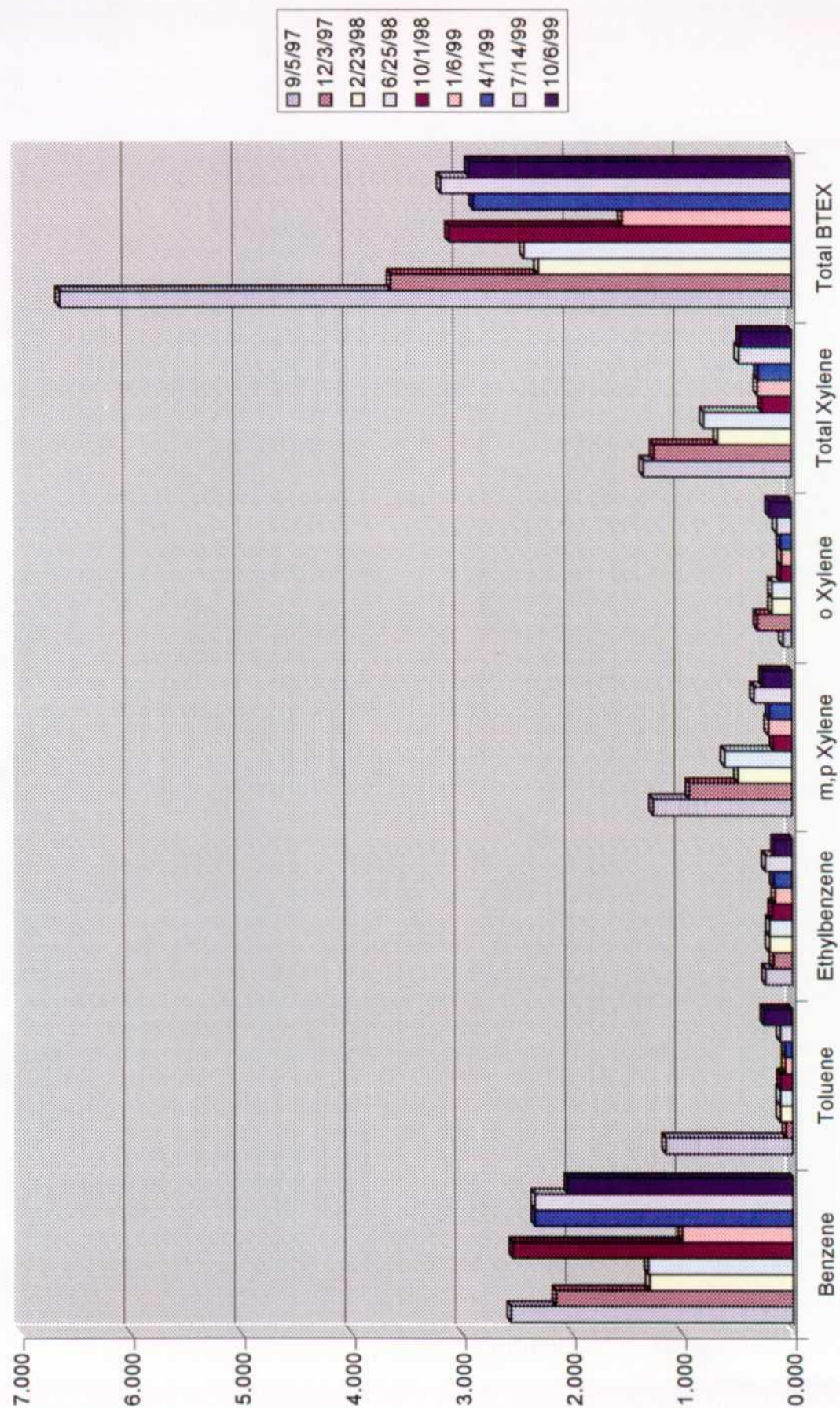
Monitor Well # 30

This lateral delineation well was drilled and completed in August 1999. We anticipate that the January 2000 sampling round will show lower results.

Monitor Well # 10
Sohio State # 1
Sampling Results

Lch. #	12483	13188	14086	14665	15597	16604	17437	18596	20601
Sample Date	9/19/97	12/1/97	3/23/98	6/25/98	10/1/98	1/10/99	4/1/99	7/14/99	10/6/99
Benzene	2.559	2.148	1.301	1.313	2.541	1.000	2.340	2.340	2.040
Toluene	1.148	0.062	0.113	0.113	0.108	0.067	0.067	0.110	0.255
Ethylbenzene	0.243	0.173	0.209	0.206	0.182	0.156	0.168	0.243	0.157
m,p Xylene	1.257	0.930	0.490	0.611	0.167	0.214	0.203	0.343	0.261
o Xylene	0.081	0.313	0.179	0.180	0.098	0.095	0.100	0.136	0.200
Total Xylene	1.338	1.243	0.669	0.791	0.265	0.309	0.303	0.479	0.461
Total BTEX	6.626	3.626	2.292	2.423	3.096	1.532	2.878	3.172	2.913

Sohio State # 1 MW # 10



Monitor Well # 17
Sohio State # 1
Sampling Results

Lab #	12723	13187	14081	14671	15501	18587	17438	18605	20615
Sample Date	10/2/97	12/5/97	3/23/98	5/15/98	10/1/98	1/15/99	4/1/99	7/14/99	10/6/99
Benzene	0.799	1.409	1.101	1.111	0.872	0.876	1.350	1.010	1.150
Toluene	0.128	0.053	0.108	0.138	0.105	0.193	0.092	0.205	0.206
Ethylbenzene	0.141	0.116	0.130	0.118	0.071	0.094	0.079	0.146	0.289
m,p Xylene	0.628	0.535	0.376	0.379	0.242	0.339	0.248	0.482	0.304
o Xylene	0.292	0.192	0.148	0.174	0.129	0.163	0.138	0.240	0.176
Total Xylene	0.920	0.727	0.524	0.553	0.371	0.502	0.386	0.722	0.480
Total BTEX	2.908	2.305	1.863	1.920	1.419	1.665	1.907	2.083	2.125

Monitor Well # 18
Sohio State # 1
Sampling Results

Lab. #	12724	13188	14052	14672	15609	16583	18606	20616
Sample Date	10/2/97	12/3/97	3/23/98	8/25/98	10/1/98	1/6/99	7/14/99	10/6/99
Benzene	1.276	2.063	1.396	1.357	0.542	1.100	3.540	2.470
Toluene	0.614	0.178	0.269	0.272	0.072	0.247	0.553	0.486
Ethylbenzene	0.206	0.118	0.159	0.131	0.025	0.107	2.88	0.066
m,p Xylene	0.553	0.001	0.823	0.589	0.093	0.415	0.967	0.594
o Xylene	0.648	0.001	0.366	0.252	0.054	0.203	0.532	0.444
Total Xylene	1.201	0.002	1.189	0.841	0.147	0.618	1.499	1.038
Total BTEX	4.498	2.361	3.013	2.601	0.786	2.072	8.472	4.06

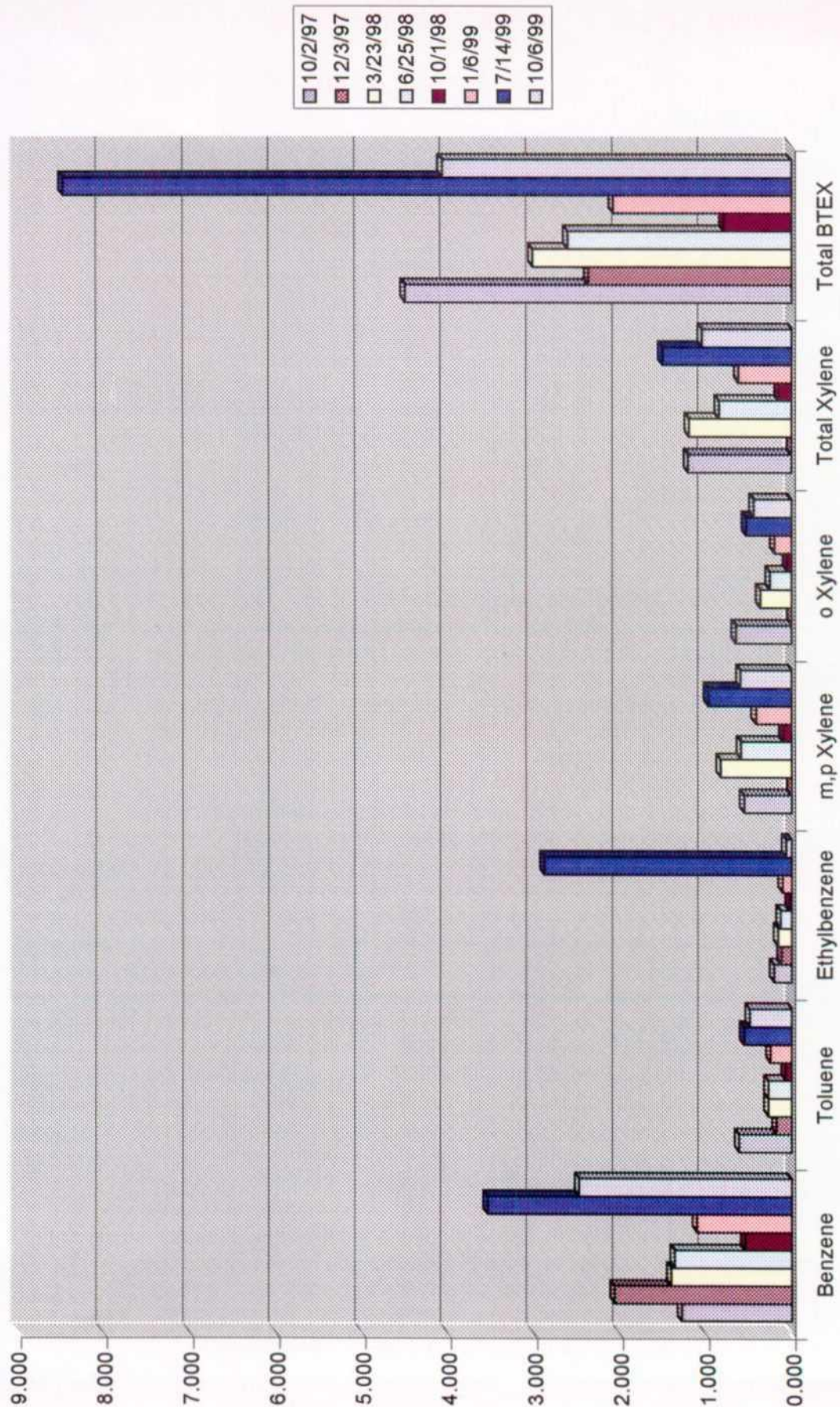
Monitor Well # 28
Sohio State # 1
Sampling Results

Lab. #	17287	17440	18607	20617
Sample Date	3/19/99	4/1/99	7/14/99	10/6/99
Benzene	0.118	0.446	0.019	0.192
Toluene	0.019	0.065	0.003	0.042
Ethylbenzene	0.005	0.011	0.004	0.070
m,p Xylene	0.004	0.041	0.008	0.001
o Xylene	0.008	0.058	0.005	0.034
Total Xylene	0.012	0.099	0.013	0.035
Total BTEX	0.154	0.621	0.039	0.339

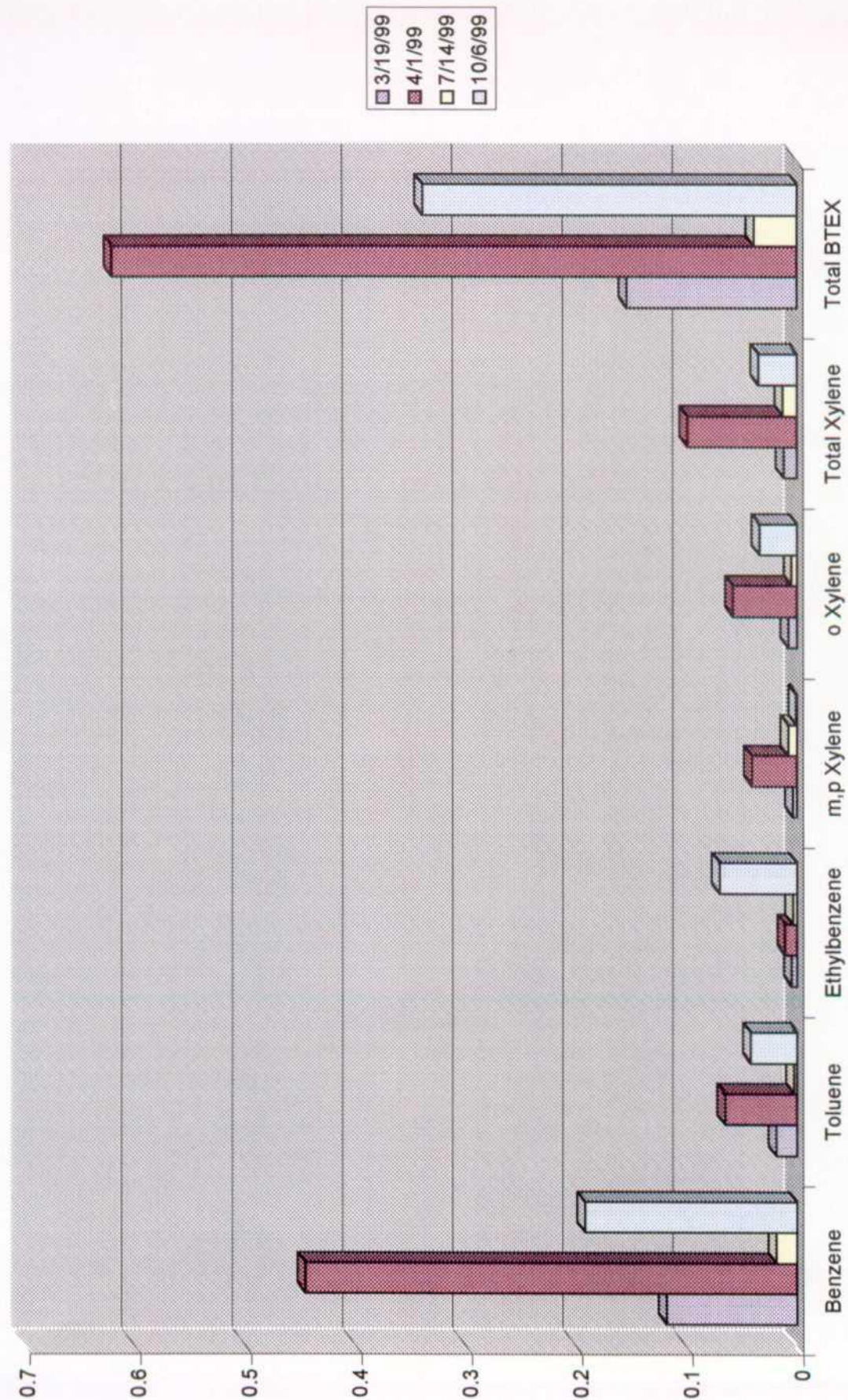
Monitor Well # 30
Sohio State # 1
Sampling Results

Lab. #	19165	20618
Sample Date	8/13/99	10/6/99
Benzene	0.001	0.108
Toluene	0.001	0.087
Ethylbenzene	0.001	0.023
m,p Xylene		
o Xylene		
Total Xylene	0.002	0.131
Total BTEX	0.005	0.429

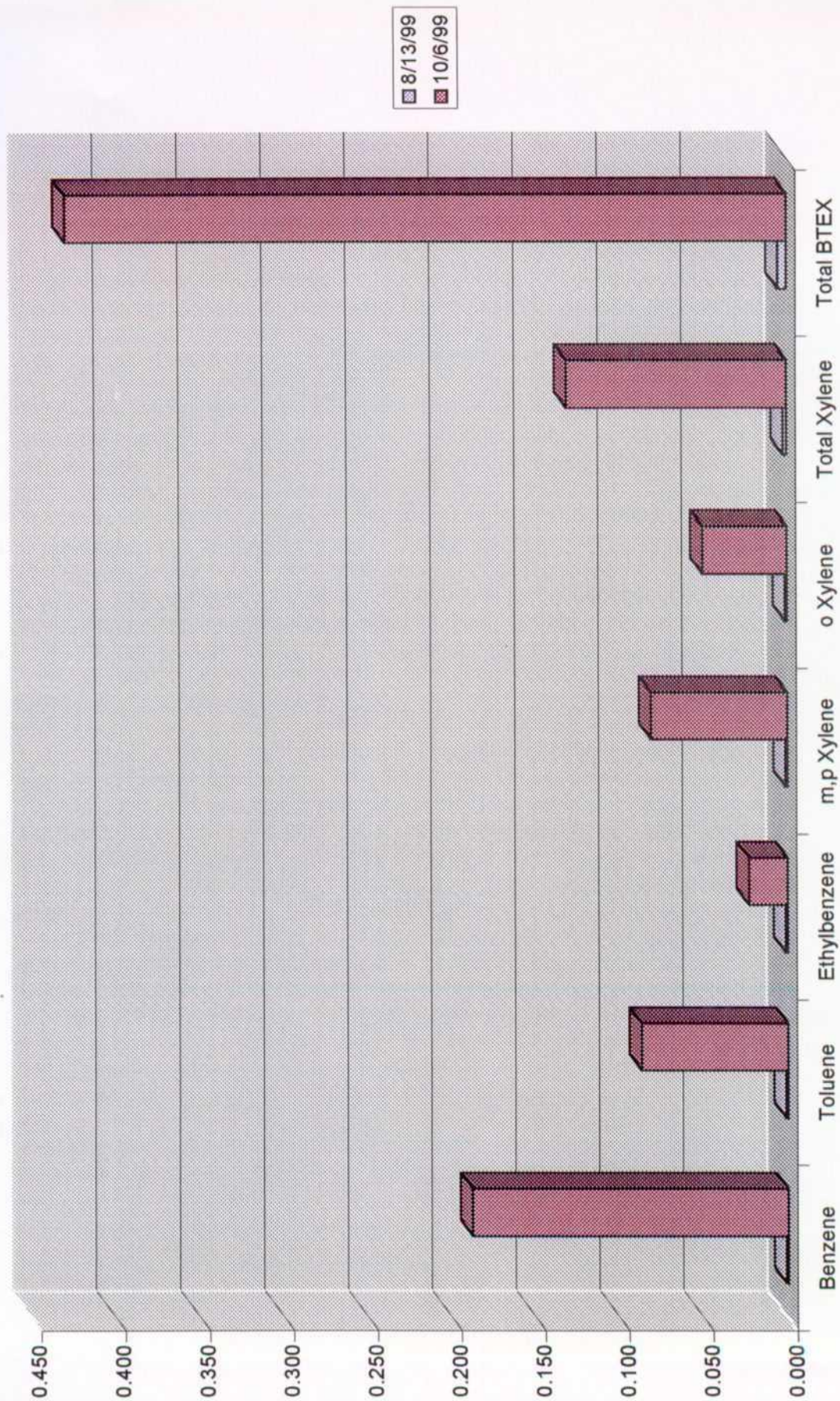
Sohio State # 1 MW # 18



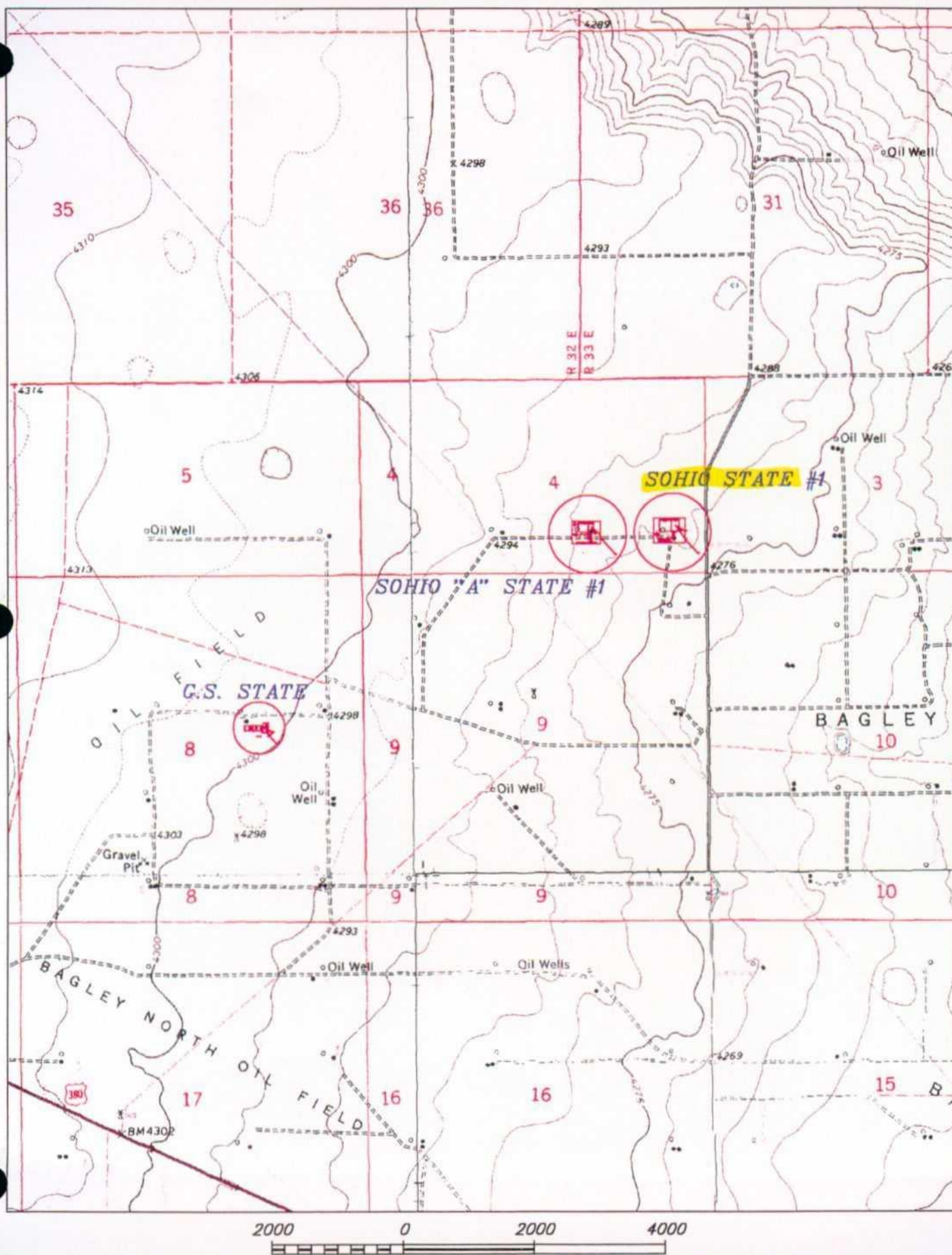
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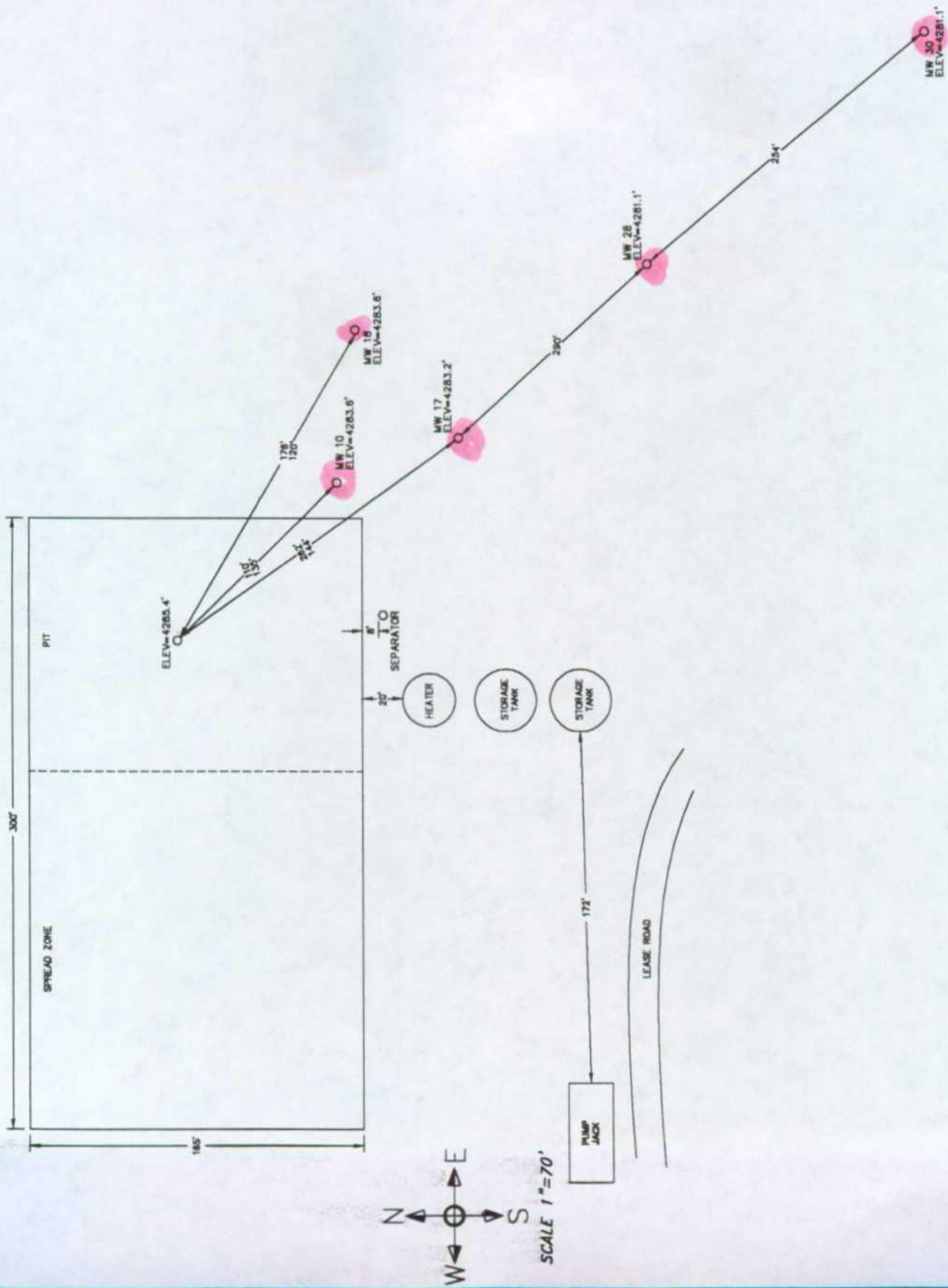
Sohio State # 1 MW # 30



WHOLE EARTH ENVIRONMENTAL, INC.



SOHIO STATE #1





Tipperary Corporation
Tatum Pit Closure Project
Monitor Well Water Elevation Table

Well Name	Monitor Well No.	Surface Elevation	Date Well Drilled	Water Depth @ Drill Date	Water Elevation @ 800/89	Water Depth @ 10/21/89	Water Elev. @ 10/21/89	Depth Change Aug./Oct. '89	Distance to Pit Center (ft)	Gradient (ft./ft.)	Gradient (ft./100 ft.)
Tatum	1	4,298.42	Aug-97	52.0	4,248.42	51.78	4,240.35	2.92	115	0.080174	8.02
	2	4,291.93	Aug-97	53.0	4,237.93	48.17	4,242.76	2.33	140	0.053500	5.35
	3	4,290.55	Aug-97	52.0	4,238.55	48.75	4,238.47	3.75	148	0.022500	2.25
Mable	4	4,287.22	Aug-97	52.0	4,235.22	48.58	4,238.88	3.17	180	0.019313	1.93
	5	4,287.46	Aug-97	52.0	4,235.46	48.58	4,238.88	3.17	180	0.019313	1.93
Vera	6	4,292.98	Aug-97	53.0	4,289.50	61.50	4,237.40		159	-0.037233	-3.72
	7	4,298.90	Aug-97	53.0	4,239.90	61.50	4,237.40		159	-0.037233	-3.72
	8	4,283.05	Aug-97	51.0	4,279.80	42.13	4,238.99	0.88	93	0.021183	2.12
Bell	9	4,281.12	Aug-97	51.0	4,233.04	40.83	4,240.01	2.83	51	0.044118	4.41
	10	4,280.84	Oct-97	48.3	4,232.50	43.00	4,237.80	0.50	47	0.048723	4.87
	11	4,280.80	Oct-97	48.3	4,232.50	43.00	4,237.80	0.50	47	0.048723	4.87
NBN	12	4,280.37	Mar-99	47.4	4,232.97	43.50	4,238.87	0.00	154	0.017662	1.77
	13	4,282.45	Mar-99	47.4	4,282.45	43.50	4,238.87	0.00	154	0.017662	1.77
	14	4,281.59	Aug-97	50.0	4,231.59	43.50	4,238.08		107	0.06037	6.04
NBF	15	4,266.66	Aug-97	50.0	4,266.66	35.75	4,223.68	0.00	165	0.045152	4.52
	16	4,259.41	Aug-97	48.0	4,211.41	34.75	4,223.68	2.25	188	0.036263	3.63
	17	4,259.68	Oct-97	47.0	4,212.68	37.00	4,222.68	0.10	247	0.031579	3.16
Sohio # 1	18	4,259.06	Oct-97	47.1	4,211.96	36.00	4,223.06	-0.18	387	0.022791	2.28
	19	4,258.04	Mar-99	43.0	4,215.04	34.75	4,223.44				
	20	4,285.42	Aug-97	50.0	4,235.42	44.50	4,238.73	0.40	110	0.016273	1.63
Sohio "A"	21	4,283.63	Oct-97	49.4	4,233.63	44.00	4,238.81	0.50	282	0.008053	0.81
	22	4,283.31	Oct-97	48.6	4,233.31	44.00	4,238.81	0.35	178	0.010398	1.04
	23	4,283.59	Oct-97	48.6	4,233.59	44.00	4,238.81	0.35	178	0.010398	1.04
Sohio "B"	24	4,283.21	Mar-99	46.3	4,235.96	35.00	4,248.21	9.15	552	0.004004	0.40
	25	4,281.13	Aug-98	45.3	4,235.82	43.31	4,235.82	-1.21	776	0.005528	0.55
	26	4,281.13	Aug-98	45.3	4,235.82	43.31	4,235.82	-1.21	776	0.005528	0.55
G.S. State	27	4,285.84	Aug-97	50.0	4,285.84	35.25	4,247.63	0.25	115	0.008348	0.83
	28	4,285.85	Aug-97	50.0	4,285.85	35.25	4,247.63	0.25	115	0.008348	0.83
	29	4,285.97	Sep-97	48.7	4,237.27	35.15	4,250.82	2.65	194	0.005306	0.53
Sat # 4	30	4,285.98	Sep-97	48.6	4,236.46	38.00	4,247.98	0.68	151	0.005828	0.58
	31	4,285.61	Mar-99	40.0	4,245.61	36.83	4,248.78	1.37	284	0.004659	0.47
	32	4,283.54	Aug-98	37.5	4,246.09	37.45	4,248.09	1.45	624	0.005288	0.53
G.S. State	33	4,307.00	Sep-97	48.0	4,259.00	42.75	4,260.52	0.15	52	0.071731	7.17
	34	4,303.27	Aug-97	48.0	4,256.27	42.75	4,260.52	0.15	52	0.071731	7.17
	35	4,303.08	Oct-97	48.0	4,256.08	42.75	4,260.52	0.15	52	0.071731	7.17
Sat # 4	36	4,302.77	Oct-97	47.5	4,255.27	43.90	4,269.27	0.40	148	0.025203	2.52
	37	4,303.20	Mar-99	49.1	4,254.14	44.00	4,269.20	0.26	295	0.016475	1.65
	38	4,211.49	Mar-99	49.1	4,211.49	44.00	4,269.20	0.26	295	0.016475	1.65
Sat # 4	39	4,208.66	Aug-97	31.0	4,177.66	28.75	4,182.49	0.58	60	0.035375	3.54
	40	4,209.03	Oct-97	28.0	4,181.03	27.15	4,182.78	0.90	188	0.015570	1.56
	41	4,208.64	Oct-97	28.9	4,179.14	26.08	4,182.56	0.37	150	0.019000	1.90

Note: Vera, Bell and Sohio 4 had significant subsidence within the pit area.
The red elevations include an added 3.48' (Ave. of seven other sites)
Correct elevations noted in column 6.